

A C C S

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REVIEW
OF
EARLS
COURTSee Pages 2, 3, 7, 14, 15,
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UNDERLYING the direct appeal by the president of the Municipal Passenger Transport Association at its conference (the report on which appears on page 41) for more sympathy with, and less condemnation of those undertakings which have been expelled from the employers' federation, or have fallen from favour, because they have made additional payments as a means of attracting staff was, one assumes, the realisation that the essential framework of the national agreement is in peril and can only be maintained (to use Mr. Neal's words) if flexibility is applied in its interpretation. Of course differential wage rates or thinly-disguised incentive bonuses are untidy, cause friction between adjacent undertakings, and threaten to weaken the collective bargaining machinery. But there cannot fail to be alarm at the distressing rift which has appeared within the ranks of M.P.T.A. members on this matter. Realism dictates that a gap like this which tends to widen must be plugged before the umbrella fabric disintegrates. No longer is it admissible to discriminate between black sheep and goats. A new move which seeks to accommodate those whose labour problem is particularly intractable therefore deserves well of all. It was the voice of reason and sanity that was expressed through the M.P.T.A. president who, during the conference, received more than one warm-hearted tribute on a term of office which, because of his special qualities, has endeared him in the minds of many and in which he has been a source of inspiration and admiration.

Where Service Leads

OF Mr. Noel McDonald's paper, outlining the objectives of his Warrington economy rerouting scheme, it can be said that it appeared to rouse envy among many managers and transport committee chairmen that they should have either no scope, or more probably, no opportunity to invoke similar schemes. Mr. McDonald was quick to admit that in one respect his situation had been unique in that Warrington had, since 1945, lost for good and all a very sizeable slice of the British and U.S. forces stationed there, most of them faithful bus passengers. In other words, he had to cut his cloth accordingly, but so convincing were his arguments for straightening out "dog's legs" and similar route eccentricities that one half expected him to conclude with a warning to all and sundry that, short of some "dog's legs" of their own to get rid of, the remaining avenues for economies were limited indeed! The concept of service to the public is, of course, never far in the background at a busmen's conference. The Isle of Man could prove an ideal mentor. On both Douglas Corporation and Isle of Man Road Services buses (which cover much very thin territory with excellent frequencies) the conductor says "thank you" and really means it and is positively bursting to help the stranger in all sorts of ways (some not provided for in the rule book). Nothing is too much trouble. To contrast the reception one gets on the little island with that implied in the now classic observation of a London woman conductor that "people are just a nuisance riding on the buses" leads one to the gloomy reflection that, by platform staff at least, passengers are courted inversely to the extent that they present themselves.

A Study of Inter-relationship

THE past weekend saw another of the series of successful courses organised annually by the Institute of Transport. With the main theme of "The Inter-Relation of Inland and International Transport" some 90 members spent a most pleasant and instructive time in the venerable New College, Oxford, with Major-General G. N. Russell, the immediate past-president, leading the search for enlightenment with ardour and judicious firmness. Deliberately the aspects of the subject treated by the four lecturers were kept away from any close railway relationship, although that branch of the industry obviously entered into consideration

in connection with seaports and airports. Questions evolved by the discussion groups provided not only evidence of close attention to the lectures but also appreciation of conditions prevailing in the part of the industry concerned and it was apparent that there were widespread doubts about the degree to which the shipping industry had really striven to adopt and develop modern cargo-handling methods in its vessels; considerable uneasiness was manifest as to the continued readiness of some airlines to countenance the pernicious

CURRENT TOPICS

Double-Deck Buses For Italy

ITALIAN public transport terminology will no doubt produce the equivalent of such phrases as "three on top — the rest inside" when double-deck buses are introduced in Turin in the near future. Double-deck vehicles are not entirely new to Italy; double-deck trams were in service in Rome and Milan at the turn of the century and open-top buses ran in Genoa many years ago. A feature of Italian bus operation has always been the heavy overload to which vehicles are

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practice of overbooking. Surface communications with ports and airports were generally held to need considerable improvement as a matter of urgency. Although there was a tendency to question whether the airlines paid the true cost of airport services.

Diesel Maintenance at Stratford

TIME was when the Great Eastern motive power depot at Stratford, at which 600 steam locomotives were based, was the largest of its kind in the world. Heralding the end of the steam era, due next year, there was last week an official inspection of a new diesel locomotive maintenance depot for the Great Eastern Line of the Eastern Region. In sharp contrast to the dirt and grime of outmoded steam sheds is the cleanliness, spaciousness and light of the new building, which can deal with 16 main-line locomotives at a time. Maintenance work can be carried out at three levels; on raised concrete platforms at footplate level; from a lower level where the tracks are carried on stilts for dealing with wheels and bogies; and from the pit level for getting at gear mounted below the locomotive. A shed for maintenance of diesel multiple-unit trains came into use at Stratford three years ago. As a temporary measure, pending the construction of the new depot, it was also employed on the maintenance of main-line locomotives. The new depot is double-ended, but to improve winter comfort and for convenience it is not a through shed. A two-storey workshop, amenities, stores and office block is situated right across the centre of the depot, giving easy access to staff working at both ends. This layout reduces the possibility of a locomotive wanted in service being blocked in by one under repair.

liable to be subjected and in the mid-thirties many Italian transport undertakings turned to the articulated large-capacity bus of the type which subsequently also became popular in other European countries and which has achieved success in Bologna, Milan, Rome and Turin, as well as on some interurban routes. One manufacturer alone built several hundred of such vehicles and although they are somewhat difficult to handle in narrow thoroughfares as found in Rome and Naples, they have nevertheless provided the operator with the reserve capacity to cope with traffic peaks. Unfortunately, new legislation has now reduced the permissible overall length of articulated p.s.v.s to 45 ft. 11 in. and Rome, which since last December has confined operation of articulated buses to one route (Termini—Tivoli), undertook an investigation into alternative forms of crush-load vehicles.

Several Experiments

TWO members of the Rome Transport Board visited a number of towns in Germany to study the operation of the 1½-deck bus, which has gained many supporters there. As an indirect result of this tour an agreement was signed by Macchi of Varese to build the Ludewig-Aero 1½-deck under licence and the first Italian-made prototype is to enter service in Rome shortly. At approximately the same time Officine Viberti, of Turin, announced that that city had placed a pilot order for the supply of 12 double-deck buses of a novel patented design. The Viberti double-decker is of low overall height and is claimed to have an unusually low centre of gravity. Engine and running units will be of Fiat manufacture. It is expected that Milan and Naples will soon place orders for the new Viberti vehicles and Rome will make experiments.

Disastrous Locomotive Failure

RAILWAY accidents are rarely due to faulty mechanism in the power unit. An exception was provided by a serious mishap at Settle on the Midland line to Scotland in the early hours of January 22, 1960, when five of the 75 passengers in the 9.5 p.m. Glasgow-London express lost their lives and eight passengers and the guard of the 10.40 p.m. Leeds-Carlisle goods train were injured. In his report (H.M. Stationery Office, 4s. 6d.) Brigadier C. A. Langley, Chief Inspecting Officer of Railways, finds that the accident was caused by failure of the Britannia class locomotive that was hauling the express. Its driver had stopped the train at Garsdale, 20 miles from the scene of the accident, to examine the engine which had developed a serious knock, but as he could find nothing wrong he decided to continue at reduced speed to Hellifield, five miles on the London side of Settle, where there is a locomotive depot. The knocking continued, and while the express was approaching Settle at about 45 m.p.h. part of the right hand motion assembly came adrift, struck the ballast and threw up stones and sparks. On seeing this the driver made a full brake application, but the motion assembly, comprising the piston rod, cross-head and connecting rod still attached to the driving wheel, was driven deep into the formation and overturned into the trailing position. The cross-head then struck the opposite line and damaged it to such an extent that the freight train, travelling at about 25 m.p.h., was derailed towards the 6 ft. way between the tracks. The front of the freight engine tore out the sides of the first three coaches of the express and scored the sides of the other five vehicles. Examination of the express engine showed that the two bottom right hand slide bars had fallen off, thus allowing the piston rod, cross-head and connecting rod to come adrift. It was a dark night with winds of gale force, and snow covered the formation to a depth of several inches.

A Remarkable Accident

IN dealing with the "remarkable circumstances" of this accident, Brigadier Langley says that allowance must be made for the weather when considering the failure of the express driver to notice the loss of the slide bars at Garsdale. His decision to continue to Hellifield was reasonable in view of the late hour, inclement weather and exposed position of the train, but he should have sent a message to the shedmaster there and travelled very cautiously. He and his fireman said the speed never exceeded 20 m.p.h. but signalbox bookings showed an average of over 39 m.p.h. "He must bear some measure of responsibility," the report states. It goes on to indicate that responsibility must also be shared by those engaged in the locomotive's maintenance and overhaul. The failure was initiated by the loosening of a slide bar bolt, and in examining the problem of keeping locking nuts tight, particularly on Britannia class locomotives, the Chief Inspecting Officer describes the steps already taken to this end. In view of the vibration and stresses to which engine bolts are subjected, he says, the provision of efficient locking devices is essential. Various types of locking nuts have been tried but none has been found satisfactory; in consequence reliance is placed on the use of substantial fastenings properly tightened and held from loosening by carefully fitted pins or cotters. It is most important that these fastenings are easily accessible and he recommends special attention to this feature in the design of future locomotives of all types, both diesel and electric. "Difficulty in reaching such parts can lead to slack maintenance as has been exemplified by this accident and the investigations which have followed it." He recommends that the facts of this case be brought to the notice of all the motive power maintenance staff concerned and that special steps be taken to ensure that proper attention is paid to the security of fastenings on which so much of the safety of the engine depends. He concludes by expressing gratification at the efficiency of the emergency services.

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The Editor is prepared to consider contributions offered for publication in MODERN TRANSPORT, but intending contributors should first study the length and style of articles appearing in the paper and satisfy themselves that the topic with which they propose to deal is relevant to editorial requirements. In controversial subjects relating to all aspects of transport and traffic this newspaper offers a platform for independent comment and debate, its object being to encourage the provision of all forms of transport in the best interests of the community.

We desire to call the attention of our readers to the fact that Russell Court, 3-16 Woburn Place, London, W.C.1, is our sole London address, and that no connection exists between this newspaper and any other publications bearing somewhat similar titles.

A Vigorous Industry

DESPITE handicaps of an inadequate road system, high fuel tax and Government restrictions on dimensions, the resilient British commercial vehicle industry continues to flourish and even to show more stability in demand than its private car counterpart. This Friday the Commercial Motor Show opened at Earls Court; the fertility of design displayed there and yet the use of well-tried and reliable methods and units supplies ample reason for success, to which design teams, research workers and enterprising manufacturers have all contributed their share. In the exhibition are 32 makes of commercial vehicle, 27 from Britain, four from Germany and one from France. There are 82 bodybuilders and trailer builders, 226 accessory and component manufacturers, 14 tyre firms and 44 concerns in the transport service equipment business. Further there are 24 stands representing the press, associations, service or information facilities. Of the 422 stands, totalling 278,000 sq. ft. of area, 160,000 sq. ft. will be devoted to motor vehicles and trailers, and making the largest single demonstration of commercial road transport equipment staged anywhere in the world. Visitors to the show from the United Kingdom totalled 106,558 in 1958, while the interest the event now arouses overseas brought an all-time record of 3,641 people through the turnstiles; they came from more than 70 countries and were mainly traders and buyers.

Advanced Vehicles

SUMMARISING the main features of the current British commercial vehicle, Mr. Geoffrey Rootes, president of the Society of Motor Manufacturers and Traders, called attention to the marked trend towards ease of access for the driver in forward control vehicles, a facility of the greatest importance on local delivery duties. At the other end of the scale, where the movement of heavy loads is concerned, there is a growing tendency towards the use of the articulated vehicle with the advantages that system can offer, in suitable circumstances, for the more continuous and economic use of the motive unit. The advent of motorways in this country will probably increase still further the demand for this type of transport. Motorways will also create a move towards increased power and the greater use of two-speed rear axles and gearboxes with five or more to take full advantage of the sustained and speedy flow of traffic which they permit. Air suspension, fully automatic transmission, integral construction, power steering and disc brakes

are features of the show, especially on buses, while power-assisted steering is becoming more popular in the heavier goods classes.

Plating

ALL the developments named are associated in one degree or another with the aim to promote safety on the roads. Apart from the question of road development, there is one very real contribution which Parliament can make," declared Mr. Rootes, "to this end. At present—and we have only to look at some of the vehicles on the road to confirm it—goods vehicles can be and often are grossly overloaded. A regulation limiting the gross weight that any given chassis could carry to the figure recommended by the manufacturer and incorporating a vehicle plating scheme would put an end to this dangerous practice," he felt, optimistically ignoring, as it seems to us, the difficulties encountered in the thirties on this very matter. Some of the vehicles at the Show are for export only and not permitted on the roads of this country. Among these are single-deck passenger models which exceed the 30 ft. length specified by our law. In Europe and other continents, the 35-ft. vehicle is an accepted standard. It would avoid the splitting of the production line and make for more economical output if the limit were to be raised so as to enable our manufacturers to sell vehicles of this dimension on the home market also. Our roads are slowly improving but far too little is being spent on them proportionally to our volume of traffic. In this connection there is a ray of hope from the Road Research Laboratory that the money may be spent in the best possible way.

Selecting Road Schemes

AFTER four years of investigation the Road Research Laboratory has developed a method by means of which priority may be given to road improvement schemes on the basis of their relative value to the community. In an introduction the D.S.I.R. technical paper expounding this valuable aid to highway engineers comments that because of the number of planned road improvements which are already pigeonholed a full-scale survey of all the improvements that may be desirable must wait. To that extent it is not impossible that there are potential improvements elsewhere in the road system which are more deserving even than those accorded the highest priority when examined by the new method. This, quite briefly, enables the net annual benefits expected to result from the road works to be expressed as a percentage of their capital cost, the resultant rate of return being used as an indication of the priority to be accorded to the works. Generally speaking, the effects five years later on annual vehicle mileage, average speed (or delay) and personal injury accidents at the scene of the proposed improvement are estimated and values placed upon them, to give the annual saving arising out of the improvement. Detailed instructions and formulae are laid down in the step-by-step working out of the method. If universally applied there can be no doubt that it would give us the best worth for the available money.

Faster Pace Needed

SO far the Ministry of Transport record, although improved over the immediate postwar tally, gives little prospect of matching Mr. Marples's bold words of "a network of motorways by the mid-sixties." It looks rather as if we shall have some pieces of motorway separated by frustration-producing sections of rank bad roads. In the nature of things the county engineers often begin on the sections of a road improvement plan which are easiest to tackle, leaving the difficult portions—those most obstructive to commercial vehicle and bus operation—to the last. However, in the past six months the British Road Federation has recorded a start on schemes worth £39 million, including the 28-mile section of the Birmingham-Bristol motorway between Twynning and Lydiat Ash due for completion by October, 1961, at a cost of £8,580,000. More of the urge towards high-speed construction which distinguished the building of M1 would not come amiss; nor would greater attention to faulty road design as a cause of accidents, a feature which was emphasised by Mr. J. Leeming, county surveyor and engineer, Dorset, to the All Party Roads Study Group of the House of Commons before the summer recess.

NEWS SUMMARY

THE new maintenance depot for main line diesel locomotives at Stratford represents another stage in the modernisation of what was once the world's largest steam motive power depot on which were based 600 locomotives. Just now there are 100 steam locomotives allocated to Stratford; there are 26 diesel railcars, 80 diesel shunters and 73 main-line diesel locomotives. Eventually the last mentioned figure will rise to 150.

The Ministry of Aviation has announced further details of the transfer of functions from the Air Transport Advisory Council to the Air

Transport Licensing Board. The Board is formally constituted from October 1 and a nucleus of its secretariat is already installed temporarily at 3 Dean's Yard, Westminster, S.W.1. It is hoped that Section 1 (2) (b) of the Act should come into force on or about March 30, 1961.

Mr. R. M. Robbins, hitherto secretary and chief public relations officer of the London Transport Executive, has been appointed chief commercial and public relations officer.

Mr. F. K. Pointon, general manager of East Midland Motor Services, Limited, has been appointed to the executive of the British Electric Traction Co., Limited.

GOODS VEHICLE CHASSIS

Round the Stands at The Show

EMPHASIS ON HIGHER POWER

NOW that all the secrets are out, it is evident that the 20th International Commercial Motor Transport Exhibition, which opens at Earls Court today (September 23) and continues until October 1, presents as many new and improved vehicles and components as any of its predecessors, providing evidence, if that were needed, of the continuously advancing technology and dynamism of the industry. This is as it should be, for despite the very few foreign vehicles exhibited—only French and German manufacturers are represented, Renault, Goggomobil and Volkswagen in the light van field and Mercedes-Benz and Magirus-Deutz in the heavier classes—competition from the Continental manufacturers in many of our traditional markets is real and earnest and British designers and producers must remain on their mettle if the excellent export results of the recent past are to be maintained.

There is no question of the interest displayed by the rest of the world in what Earls Court has to show every second year and the 1960 exhibition appears likely to attract as many overseas visitors as have those of the past. Moreover, the current exhibits will make

wheelbase and compact dimensions for easy manoeuvrability in confined spaces, as well as an easy-access three-man cab. A new feature that provides improved performance and operating flexibility is a five-speed constant-mesh gearbox, with an optional overdrive sixth speed available, in place of the earlier four-speed unit. Three examples of the popular 7-ton Chieftain are the left-hand drive chassis already referred to, a second long-wheelbase chassis equipped with the new plastics cab and light-alloy platform body and a tractor fitted with Scammell automatic coupling gear. A Clydesdale 14-ton-gross two-axle chassis equipped with 4-cu. yd concrete mixer and a Reiver three axle chassis both feature the new Leyland Power-Plus O400S diesel of 125 b.h.p.

Atkinson Trailer-Haulers

Emphasis on stand 59, occupied by Atkinson Vehicles, Limited, is on the company's maximum-weight range and particularly on eight-wheelers designed for trailer hauling. The nine-vehicle line-up on the stand comprises five L1786 four-axle vehicles, two examples of the T746 24-ton-gross two-axle articulated tractor, a two-axle L645 lorry for 14 tons gross and a BT1366CA six-by-four heavy-duty bonneted tractor for 50 tons gross combined weight, one of a batch of 40 for South Africa. Many of the vehicles shown will be fitted with the

Undoubtedly the main centre of attraction will be the new TK range, resplendent in the familiar Bedford show livery of white and poppy red. The outstanding feature of these new vehicles is the positioning of the engine in a separate compartment at the back of the forward-control cab, with excellent access from floor level through hinged flaps each side of the engine compartment. This rearrangement puts the seating farther forward and permits low entry steps ahead of the front wheels and a full three-seat cab with a clear floor

top pneumatic suspension, by which means and an offset transmission line exceptional low loading, stability and comfortable riding have been achieved. Other examples from the wide B.M.C. ranges, including 1½- to 4-ton vehicles fitted with the angled-door FG cab also appear as well as sectioned working examples of several of the principal running units.

Front-Drive Dennis

All-independent suspension is a feature of a new front-wheel-drive vehicle, named Vendor, for loads up to about 30 cwt. introduced on stand 37 by Dennis Bros., Limited. This interesting new chassis has been developed to provide exceptionally low loading, down to 1 ft. 7½ in. above the ground, and wide freedom of body design—through elimination of front-to-rear transmission shaft and axles—for a gross weight of 3 tons 8 cwt. Front suspension employs a transverse leaf spring and wishbones, while rear suspension is by trailing arms and progressive rubber springs, with hydraulic dampers all round. Alternative power units available are Standard Motors 56-b.h.p. petrol or 57-b.h.p. diesel engine, driving through a 9-in. clutch, three speed all-synchromesh gearbox and final drive combined in one unit.

Also new on the Dennis stand are two versions of a Mark IV forward-control Pax designed for maximum running weights of up to 10 tons 4 cwt. Features of the new Pax are a redesigned cab with large one-piece windscreen incorporating plastics components, alternative B.M.C. 105-b.h.p. six-cylinder or A.E.C. 84-b.h.p. four-cylinder diesel engines, various axle ratios and a wide range of wheelbases. From the established Dennis range a Pax BVD five-tonner and a Heron three-tonner have been selected for exhibition. The Pax employs the B.M.C. 5.1-litre diesel and four-speed gearbox and is notable for its employment of 15-in. wheels and tyres to provide an exceptionally low floor line for its platform body.

Extended Dodge Range

On stand 88 Dodge Brothers (Britain), Limited, is showing five vehicles from a forward-control range extended to cover load capacities up to 9 tons (14 tons gross) and one example from its established normal-control range, which like the forward-control vehicles appears with new front-end styling. In addition, Dodge chassis appear on 11 body-builders' stands and others are available for



Atkinson type T746 tractor with plastics cab; Guy Warrior; and E.R.F. 64 RX tractor

it just as much as ever worth their while. Although not all of the innovations to be seen can be claimed to be the fruit of original British thought, by far the majority are exactly that, while others bear the unmistakable stamp of native practicability—or compromise—that has turned a good but not very practical idea into commercially and technically feasible practice.

A.E.C. Marshal

A.E.C., Limited, occupies stand 80, where one recently introduced goods chassis, the Marshal, is on public view for the first time. The Marshal is a three-axle addition to the company's medium-weight range designed particularly for service overseas where axle loads are legally restricted, but capable also of operation at home at the legal maximum gross weight of 20 tons. In fact, the chassis is already becoming popular with domestic works and building contractors for its ability to

new Atkinson plastics-panelled cab. A further five Atkinson vehicles are to be seen on the stands of bodybuilders, while two eight-wheelers in the demonstration park are both equipped for towing independent trailers.

The Atkinson range well demonstrates the art of building high-quality vehicles precisely to customer specification from a wide variety of proprietary units. All the vehicles shown, except one, are powered by Gardner diesel engines, the majority by the 150-b.h.p. 6LX unit. The exception is the South African tractor, which has a Cummins 212-b.h.p. diesel, though the type can take a Rolls-Royce unit equally well. David Brown or Z.F. five- or six-speed gearboxes are generally fitted and the Self-Changing Gears eight-speed semi-automatic unit is also available in the heavy-duty tractors. Of particular interest on the stand is a lightweight version of the eight-wheeler designed for high-speed motorway operation. Gardner 6LX-powered, with a six-speed overdrive

and very deep windscreen. Although employing similar main running units to the earlier forward-control Bedfords, other innovations in TK chassis comprise a new and greatly improved braking system, including transmission handbrakes, an extension of the use of 16-in. wheels and tyres to the 5-ton capacity chassis, with 17-in. instead of 20-in. equipment also available on 6-tonners, and a new 7½-ton capacity chassis.

B.M.C. Newcomers

Additions to the B.M.C. ranges of Austin, Morris and Morris-Commercial vehicles are to be seen on stands 71, 81 and 93, while the popularity of B.M.C. chassis for mounting special bodies and equipment is demonstrated by large numbers so equipped appearing on more than 20 bodybuilders' stands and in the demonstration park. Both Austin and Morris versions of the intriguing little 5-cwt. delivery van appear, to make a worthwhile study in departure from orthodoxy that arrives at its



New Standard Atlas Major 10-12 cwt. van; new B.M.C. Austin 10-12 cwt. van; Renault Estafette new high-top 12-cwt. van; and Bedford l.w.wb. 15-cwt. van with new 13-in. wheels

carry a fully charged 6-cu. yd. cement mixer within the weight limit. The Marshal is powered by the successful A.E.C. AV470 diesel engine, set to produce 112 b.h.p. at 2,000 r.p.m., driving through a five-speed synchromesh gearbox and double-drive spiral-bevel axles, mounted in an oil-less rubber bogie suspension.

Also on the stand is an example of the well-established two-axle Mercury Mark II 14-ton gross weight range. This chassis is fitted with a Park Royal cab in the colours of Crow Carrying Company; it embodies similar running units to the Marshal. Numerous other A.E.C. goods vehicles are shown on bodybuilders' stands, while in the demonstration park there are a Mercury tractor coupled with the new Duramin frameless light-alloy van semi-trailer and a Mammoth Major four-axle tanker in the colours of Harold Wood and Sons. An alternative power unit for the Mammoth Major is the recently introduced AV690 diesel engine developing up to 168 b.h.p. and a sectioned working engine is seen on the A.E.C. stand.

More Power For Albion

On stand 56 there are six chassis from the current range of Albion Motors, Limited, while a further 12 are displayed on various bodybuilders' stands and two are available for demonstration outside. Main points of interest are the new higher-powered engines for the Clydesdale and Reiver; a new non-reactive bogie suspension on the six-wheeler; the weight-saving resin-glass cab fitted to a Chieftain chassis, which also has the latest version of the larger of the two Albion four-cylinder diesel engines; a new gearbox fitted to a Claymore underfloor-engined five-tonner; and a long-wheelbase Chieftain with left-hand drive and specially equipped for operation in the United States of America, where the type is already in operation with several important operators. A sectioned working example of the 5.5-litre four-cylinder engine, which features the C.A.V. DPA distributor fuel-injection pump and develops 95 b.h.p., also appears on the stand.

Smallest of the vehicles on the stand is a Claymore brewery lorry; its well-known features include a horizontal diesel engine mounted under the frame, providing large body space with short

gearbox and fitted with Holmes Homally 24 ft. by 8 ft. body, it is one of 34 on order for Cawthorn and Sinclair, Newcastle upon Tyne.

Bedford TK Range

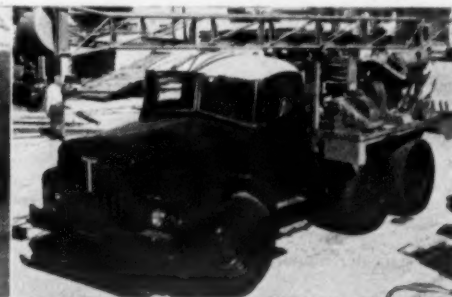
Much of the area of stand 76 is devoted by Vauxhall Motors, Limited, to its new TK forward-control Bedford range. Four of the new range appear—a petrol-engined 4-ton capacity chassis and cab, Bedford diesel-engined 6-ton lorry and 6-ton tipper with Telehoist gear and steel body and a 7½-ton dropside lorry powered by the Leyland O350 diesel engine. Another Bedford making a

declared goal—robust low-cost transport for the local tradesman. Features of interest are a combined engine-gearbox-final-drive unit in quickly removable sub-frame, front-wheel drive, all-independent rubber suspension and very low centre of gravity. In a recent extended MODERN TRANSPORT road test, reported elsewhere in this issue, one of these vans, which cost only £360, demonstrated its ability to achieve about 45 m.p.g. in fully loaded simulated delivery work and nearly 60 m.p.g. laden over our standard route at an average speed of 30 m.p.h.

Other new B.M.C. vehicles on show are the

demonstration. For the first time Dodge vehicles at the exhibition will be all diesel engined, the company having dropped production of petrol engines, as well as of articulated tractors in the normal-control range. Power units now used are the new Perkins Four 203 and direct-injection Six 354, the Mark II R6 and the Leyland O375. One of the new 354-cu. in. engines is shown on the Dodge stand, while a Dodge-York tandem-axle unit for a new factory-approved rigid six-wheeler is also displayed.

The new 9-ton capacity chassis exhibited is shown stripped of sheet metal so that all details



Scammell Super Constructor; Foden export six-wheeler with tropical plastics cab; and Thornycroft Sandmaster Trusty with Failing oil-drilling rig

first appearance is the light pick-up truck, featuring passenger-car comfort and performance from a new Vauxhall 2.6-litre petrol engine, and the latest version of the ubiquitous Bedford light van, which now incorporates 13-in. wheels and tyres for lower loading and improved stability and has a payload capacity increased by 200 lb. A 5-cu. yd. tipper from the bonneted range and sectioned working examples of the Bedford 300-cu. in. diesel engine and two-speed rear axle make up the manufacturer's display. No fewer than 10 bodybuilders also exhibit Bedford goods vehicles on their stands and various examples are available in the park for demonstration.

10-12 cwt. forward-control vans, which supplement the well-established J2 and 152 15-cwt. vehicles and employ common running units, Edbro and Telehoist versions of the 6-cu. yd. steel tippers, now factory fitted on diesel-engined 702 chassis and a new long-wheelbase pick-up version of the four-wheel-drive Austin Gypsy in the demonstration park. A standard version of the Gypsy on the Austin stand is another example of B.M.C. use of all-independent rubber suspension, though in the l.w.b. version semi-elliptic steel springs replace the Flexitor units at the rear. A Morris LD5 chassis used as the basis of a plastics-bodied ambulance by Wadham Bros. is also notable for employing Dun-

of the construction can be examined. It is the longest of three in the range with a wheelbase of 18 ft. 9 in. to take a standard 22 ft. 6 in. body, but in fact capable of accommodating a maximum legal body length of 24 ft. 11 in. Features are a slitch-plated 11½-in. deep frame, the 375-cu. in. diesel engine, 14-in. hydraulically operated clutch and constant-mesh five-speed gearbox, three-piece propeller shaft, two-speed rear axle and air servo-hydraulic brakes. A 12-ton articulated tractor with 8 ft. 4 in. wheelbase and fifth-wheel coupling shown has a generally similar specification and the display is completed by two versions of the new

(Continued on page 8)

LORRY—BUS—COACH

London Bonus Scheme
Goes to Garages

ON Monday this week the delegate conference of London busmen heard from the union negotiating committee about the revised London Transport incentive bonus scheme and, by 68 votes to 41, decided that it could now be referred to the garages for their views. The negotiating committee, perhaps smarting from its adverse reception last time, did not make an immediate recommendation either way to the conference, but waited to see which way discussion of the scheme went. Then it made a recommendation. The committee earlier decided to reject that part of the bonus involving payment to crews for time made up, partly because it might reduce overtime earnings by more than the amount of the bonus. If approved the scheme could be introduced next week, with an interim bonus of 10s. 6d. or 9s. 6d. to drivers and conductors in the Central area (depending on the class of garage) and 9s. a week to Country area men. In addition there would be a safety bonus. London Transport says it would regard these weekly payments as the minimum as long as normal working was maintained.

In the meantime a deputation selected from 100 London busmen (said to represent 20,000 petitioners) who called at Transport House on Tuesday to see Mr. Frank Cousins asked him to champion their call for a public inquiry into the causes of London Transport staff shortages. They feel discontent at what is thought to be preferential treatment for L.T.E. railwaymen. Mr. Cousins and Mr. Harry Nicholas, assistant general secretary of the T.G.W.U., are understood to have promised consideration of the problem after the bonus scheme negotiations are disposed of. At a public meeting at St. Pancras Town Hall to support the campaign, said to be backed by 45 garages, the usual forecasts of imminent collapse of London's public transport were freely made.

Eire Eager for Coach Tourists

THERE was a meeting last week in London of British coach-tour operators who have featured Irish holidays in their programmes. It was held under the auspices of Bórd Fáilte. A survey was made of the past season and the meeting discussed desirable improvements in cross-Channel transport services, itineraries in Ireland, hotel tariffs and facilities and the joint publicity campaign in Britain operated by Bórd Fáilte and the tour companies.

Fares Did Not Provide for Renewals

WHEN the Gosport and Fareham Omnibus Company asked the South Eastern Area Traffic Commissioners at Gosport on September 13 for permission to increase fares by 1d., which it was estimated would bring in an extra £26,743 revenue, it was stated that one of the company's problems was that with the present scale of fares it had never been able to provide as much as it wished for the replacement of old vehicles. Now,

the time had come when it would have to go in for an intensive programme of replacing its fleet. Said Mr. S. D. Herington, representing the company: "The company has been very skilful in maintaining its vehicles on the road beyond their estimated 12 years' life. Now it thinks it reasonable to set a target figure of £32,000 as the amount it will have to find for replacements each year."

Announcing that the application would be



A.E.C. Mercury with Pilot body and tipping gear operated by the National Coal Board in the North-West. The crane is a Jones. The attractive new furniture van (right) has Bonalack light alloy and cab and is based on a Commer Avenger chassis

granted, Mr. H. J. Thom, the chairman of the commissioners, said they were perfectly satisfied that the additional revenue was required. They complimented the company on managing to come to terms with the local authorities, and thought the idea of the new return fares to avoid the payment of the extra penny was a sound one. During the hearing, Mr. A. J. Whitaker, traffic manager, was asked if they had considered introducing "standee buses" such as were being used in Portsmouth. He replied that they had had no proof that Portsmouth found these vehicles successful. The chairman: "They are ordering more of them."

Leamington Bus Station

LEAMINGTON should have its first passenger bus station in operation next month, after more than 20 years, during which the project has been under discussion. It is adjacent to the Avenue Railway Station.

M. & D. Rebuilds at Sittingbourne

NOW in full use again after its recently completed rebuilding is the Maidstone and District garage at East Street, Sittingbourne. The staff were under a considerable handicap for nearly 12 months as the old building was demolished around

them and the new one took shape. Buses were for a time evacuated to park on a nearby open space. The new building replaces an old timber structure which had been in use since the depot was opened and which was originally a 1914-18 war aeroplane hangar that had been re-erected on the site. Designed to house 26 vehicles, four more than the previous garage, the new one is of steel construction, with stanchions, lattice girders and northlight roof trusses covered with asbestos and patent glazing.

Minibuses in the North East

JOINING its voice to those of other operators, the Northern General Transport Co., Limited, is complaining of the number of what appear to be little pirate buses operating in the North-East. Every day, it says, dozens of minibuses may be seen parked outside collieries and other industrial

purposes and effect considerable economies in transport costs. Portolite flexible tanks are made by Marston Excelsior, Limited, an I.C.I. subsidiary. The container used for this consignment had an interior lining of rayon-reinforced butyl rubber, which is inert to iso-octanol.

Bus and Coach Developments

Southern National Omnibus Co., Limited, proposes a new local service on weekdays in Seaton between Seaton Station and Everest Drive via Eyewell Green.

Western National Omnibus Co., Limited, applies for a circular service from Tavistock (Bus Station) via the Hospital and Geyvintor.

Glider and Blue Motor Services, Limited, Bishops Cleeve, which has been controlled by Mr. B. S. Williams since the beginning of the year, is being managed by Mr. R. Candlish and the Southwell family which commenced operations in 1918 has retired from the business. B. S. Williams, Limited, is now working its Emsworth-Thorney Island service with a 43-seat one-man operated Leyland.

FINANCIAL RESULTS

NOTES on the trading results, dividends and financial provisions of companies associated with the transport industry are contained in this feature, together with details of share issues, acquisitions and company formations or reorganisations.

Charles Roberts

A distribution of 3d. per 5s. stock unit is to be made to ordinary holders in Charles Roberts and Co., Limited, for the year ended March 31, out of realised accretions to capital. An interim of 7½ per cent was earlier paid, but there is to be no final dividend. The 1958-59 dividend was 15 per cent. The chairman reports that an investigation of the accounts of the hire purchase finance subsidiary, S. J. Clay, Limited, has disclosed that as a result of a series of fraudulent transactions and the acceptance of business on unsatisfactory terms, a substantial loss was incurred. It appears probable that the loss will exceed £500,000, although the investigation has yet to be completed. He says that while the prospects for the current year are not promising, the financial position is "very strong," hence the proposed capital distribution of 3d. tax free on the 5s. ordinary units. The winding-up of the subsidiary Hurst Nelson, Limited, will result in a substantial surplus.

Calcutta Tramways

Tax free dividend of 3d. per 5s. stock unit is to be made to ordinary holders in Calcutta Tramways Co., Limited, is 3½ per cent (2½ per cent) for 1959.

Blundell Spence

Blundell Spence Trading, Limited, has now been formed to take over the trading and commercial activities of Blundell Spence and Co., Limited. This follows the recent acquisition by the parent company of Permoglaze Holdings, Limited.

Silentbloc

Silentbloc, Limited, is to increase its authorised capital to £1,000,000 by the creation of 5,000,000 2s. shares. This is apart from the present rights issue of 1,000,000 2s. shares on a two-for-seven basis. For the year ended May 31 the total dividend is to be 6d. per share. Consolidated net profit after tax was £206,804 (£149,799). There are at present no plans to issue the new capital.

At the annual general meeting of Oldham and Son, Limited, the chairman, Mr. John Oldham, said that in the first five months of the present financial year, increased sales and production had been recorded; in the absence of unforeseen developments, he thought that this improved trend could be expected to continue throughout the year.

Chloride Batteries, Limited, has appointed Grose (Kettering), Limited, 1 Station Road, Kettering, Northamptonshire; Massey and Bridges, Bridge Street, Fakenham, Norfolk; and R. Tinnick and Sons, Limited, Glastonbury Road, Wells, Somerset, as service agents and distributors for all types of Exide vehicle and agricultural plant batteries.

MORE NEW FEATURES FOR THE Albion range of quality trucks



9-ton CLYDESDALE

Still they come—great new improvements for the already superlative Albion range of quality trucks. Now it's a new 'Power-Plus' 125 h.p. 6-cylinder diesel for the Clydesdale, giving more punch and even greater econ-

omy. And that really means something—especially in view of the Clydesdale's past performance. 15 m.p.g. with a 9-ton payload is very ordinary form—and that on non-stop service over fifteen years or more—with repair bills always down to rock-bottom level.



1. 10-ton REIVER

Albion's unique 10-ton Reiver is also fitted with the 'Power-Plus' 125 h.p. unit and a completely new non-reactive rear suspension—features which will, more than ever, increase the demand for this lightweight 6-wheeler. Engineered throughout by the manufacturers, the Reiver is purpose-built to tackle those loads which exceed the legal limit for 4-wheelers but are uneconomical for the maximum 6-wheeler. In other words its job is to squeeze every penny of profit from every pound of payload—and it certainly will... for years after ordinary trucks have given up the struggle.

3. 7-ton CHIEFTAIN

Reports on the newly-developed 4-cyl. 335 cu. in. diesel, recently fitted to the 7-ton Chieftain, have more than fulfilled expectations. Apart from extra fuel economy, the engine has been especially admired for its easy starting, smooth running and simplicity of construction. Other features include 5- or 6-speed gearbox with helical gears, advanced-design transmission, powerful braking and a super-luxury, easy-access cab.



2. 4-5 ton CLAYMORE

For the Claymore—a new 5-speed gearbox with optional overdrive designed to step up a performance which is already unequalled by any similar class of vehicle. Fitted with an underfloor, horizontal 70 h.p. diesel, which normally averages 20 m.p.g. even in heavy traffic, the Claymore is built to give maximum body space with minimum overall length. This, with its large roomy 3-man cab and single-step access, makes it the ideal delivery vehicle for short or medium-distance hauls. And that claim is supported by operators everywhere.

4. 12-ton CHIEFTAIN-SCAMMELL

This new Chieftain tractor chassis is designed specifically for operation with Scammell automatic-coupling semi-trailers. Incorporating all the improved features of the 7-ton Chieftain, the tractor operates at a maximum laden weight of 17½ tons, with a 12-ton payload on a 25 ft. trailer. With extreme manoeuvrability and high degree of flexibility it is ideal for transporting heavy and bulky loads at low cost.

PRESENT STATE OF RAILWAY ELECTRIFICATION

4—Electric Railways in the Commonwealth*

By F. J. G. HAUT, B.Sc.(Eng.), A.M.I.Mech.E.

ALTHOUGH Great Britain, with the exception of the Southern Region, until recently paid little attention to main-line electrification and is, therefore, a latecomer in this field, the British electrical engineering firms are among the world leaders in the supply of electric locomotives, motor coaches and equipment to railways. The catalogues of firms like English Electric or the A.E.I. Group read like a complete history of railway electrification, and literally hundreds of locomotives have been supplied to the countries of the Commonwealth, to South America and even to Europe, where British firms have undertaken large-scale electrification schemes, in Denmark, Poland, Portugal and Spain, for example, which are considered very competitive markets. In this limited review I propose to quote only one Commonwealth country, namely India and its electric railways, and also some further details of work in New Zealand and South Africa.

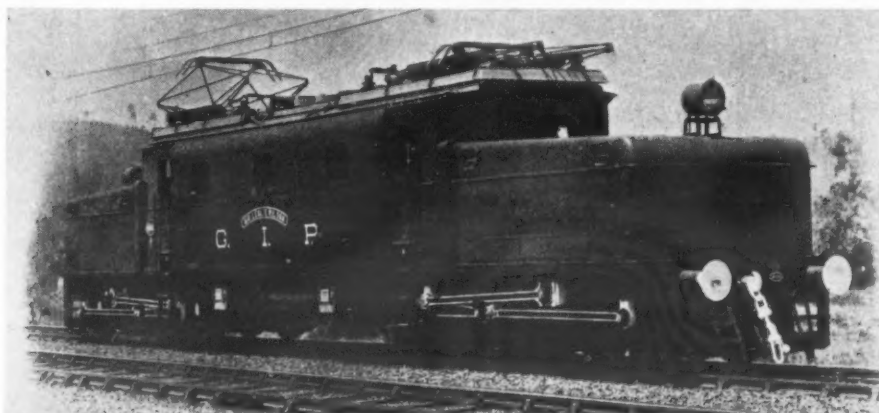
India

Dealing first with the history of Indian main-line electrification, this goes back to the electrification of the 5 ft. 6 in. gauge former Great Indian Peninsula Railway (now the Central Railway) which was carried out in 1925 and for which Metropolitan-Vickers Electrical Co., Limited, supplied a number of locomotives after test locomotives were built by various firms. The electrification

the former Bombay, Baroda and Central India) also use a number of motor coach trains, mostly supplied by British firms. Some years ago Metropolitan-Cammell Carriage and Wagon Co., Limited, supplied 28 units which comprise seven trains, each consisting of two driving motor coaches and two trailer coaches, English Electric and B.T.H. electrical equipment was used. Further orders were received later. These coaches incorporate a number of interesting developments with a view to weight reduction by use of modern methods of construction and light-weight materials, the main material being pressed or rolled steel sheet. As the coaches are to be used for suburban services, easy access is important and each coach has six double sliding doors which can be arranged for manual or power operation. The design comprises some unusual features, such as a heavy high-tensile steel structure and extensive use of plastics materials with smooth inner and outer surfaces.

High Ambient Temperatures

As the coaches often have to operate in shade temperatures up to 115 deg. F., great attention was paid to insulation. The bogies are of the four-wheel type and carry two motors each; the electrical equipment consists of four 175 h.p., 750 volt axle-hung, nose-suspended motors, which drive the 26 in. diameter wheels through single-reduction gears having a 19 to 61 ratio. The whole of the



One of the British-built 0-6+6-0 electric locomotives for the Great Indian Peninsula Railway

was carried out with the 1,500 volt d.c. overhead supply system and comprised firstly the Bombay suburban lines and later some main lines over the Ghat mountains which carry very heavy traffic. The total electrification was 185 miles in length with 582 single track miles.

The locomotives were typical of the period. The goods locomotive was of the 0-6+6-0 wheel arrangement and weighed 120 tons; its output was 2,600 h.p. It had two independent bogies with the body supported between them. The 650 h.p. motors drove through jackshafts and coupling rods. The outward appearance was the so-called "electric iron" type with two cabs and hoods each end; the latter contain control apparatus. There were two pantographs. Double-series parallel control was employed, with electro-pneumatic equipment to provide nine running positions, three in each combination, together with regenerative braking, this latter being used at speeds from 8 to 35 m.p.h. Excitation for the traction motors during braking was provided by a small axle-driven generator.

Passenger Units

Turning to the locomotives supplied for passenger services, these were of the 4-6-2 and 4-6-4 wheel arrangement. They were used to investigate the relative advantages of the various types of power transmissions and motors. The one finally selected was supplied again by Metropolitan-Vickers. The locomotive had six 360 h.p. motors working in pairs and driving the wheels via gears and hollow shafts and a flexible connection. This form of drive not only keeps the main motors above the flood levels frequent around Bombay during the monsoon period, but also gives a relatively high centre of gravity which was then considered essential for good riding qualities at high speeds.

As an example of later Commonwealth practice, I quote the C-C 3,600 h.p. locomotives supplied from 1951 onwards, again to the Central Railway. They were built by English Electric and the Vulcan Foundry and are again for operation on the Bombay-Igatpur section, with its long 1 in 40 gradient combined with sharp curves. The purpose of these new locomotives was the raising of speeds for heavy passenger and freight traffic. The locomotive underframe and superstructure are of welded steel construction. The bogies are also all-welded and carry the weight of the locomotive superstructure through a fabricated bolster. The locomotive weight is transferred from the bogie frame to the axle boxes through coil springs.

Latest Locomotives

Each bogie has three traction motors; they are of the axle-hung type and drive the axles through single-reduction resilient spur-gears. The traction motors are force ventilated, each having a continuous rating of 530 h.p. and a one-hour rating of 600 h.p. The controller has nine running positions without resistances in the motor circuits. These notches correspond to all six motors in series, and three parallel circuits of two motors in series. In each of these three connections, the motors may be run in full field, intermediate or weak field. There are furthermore 14 regenerative brake notches which are available in series, series-parallel or parallel motor groupings. Should regenerative braking be unobtainable, an emergency brake application is automatically made. In addition, should the driver make an emergency brake application, regeneration automatically ceases. An interesting feature of the locomotive is that should there be a failure of any part of the power, control or auxiliary equipment, half of the equipment may be isolated and the locomotive may proceed on the remaining half.

The Central and Western Railways (the latter is

control equipment is mounted on the main frame in a high-tension compartment.

There is another electric line which has remained isolated, the Madras suburban electrification, now on the Southern Railway. This was carried out in 1931 and has 18 route miles and 41 track miles; the voltage is 1,500 d.c. Recently the Eastern Railway introduced 3,000-volt d.c. traction over 88 route-miles on lines based on Calcutta. As mentioned before, India has now shown interest in 50-cycle electrification and has ordered recently a number of 50-cycle locomotives for test purposes and developed plans for a number of lines which are to be converted to the a.c. system.

New Zealand

Another Commonwealth country with a long history of railway electrification and its equipment supplied by British firms is New Zealand. A substantial 1,500-volt d.c. system exists, of which the Wellington-Upper Hutt electrification is a recent example. Current collection is from overhead contact wires and the track gauge is 3 ft. 6 in. In addition, the loading gauge is severely restricted by a series of short single-line tunnels, south of the Paekakariki, 26 miles distant from Wellington. The English Electric Company supplied recently some interesting and unusual locomotives, for which the following performances were specified. For freight trains one locomotive was required to haul 600 tons trailing between Wellington and Upper Hutt at a free running speed of 30 m.p.h., and to be capable of starting a 500-ton train on a 1 in 57 up grade and continuing to run. In passenger service one locomotive has to haul 400 tons trailing between Wellington and Upper Hutt at a speed of 55 m.p.h. on level tangent track, with a maximum safe speed of 60 m.p.h.

The wheel arrangement adopted is Bo-Bo-Bo and the weight is 75 tons with a maximum axle load of 12½ tons. The length over drawgear is 62 ft., and the wheel diameter 3 ft. 0¼ in. Six traction motors can be grouped 6, 3 and 2 in series and they have a one-hour rating of 300 h.p., with a continuous rating of 250 h.p. The gear ratio is 17 to 61 and the hourly rating tractive effort is 23,300 lb. at 28 m.p.h. The continuous t.e. figure is 18,400 lb. at 30 m.p.h.

Articulation

Each half superstructure of these locomotives has three-point suspension consisting of bogie centre bearings and it is supported on the centre bogie only by side rubber blocks. The outer bogies are free running and can readjust themselves to track inequalities without influencing weight distribution. The articulation between the two superstructures is so arranged that one half structure rests on the centre bearer and two side bearers of the second half superstructure, this latter half then being carried on the bogie.

The movement of the bogies relative to the superstructure is approximately only one-half of that for a completely rigid superstructure, and the side forces on the track and the clearances to structures are considerably reduced. This design also permits the overall length to be greater than that of a single superstructure locomotive and makes the positioning of the electrical equipment easier. In these locomotives we see again the simple d.c. locomotive, which is reliable, cheap, easy to maintain and operate.

South Africa

Another part of the Commonwealth which has electrified its railways extensively is the Union of South Africa. In 1925 it was decided to electrify the main line of the Natal section between Glencoe and Pietermaritzburg, using the 3,000-volt d.c.

(Continued on page 47)



TWO HUNDRED AND TWENTY SIX LOCOMOTIVES FOR BRITISH RAILWAYS

226 Brush Type-2, 1250/1365 H.P. Diesel Electric Locomotives have been ordered for British Railways, over half of these are already in service and output is maintained at a steady two locomotives per week.

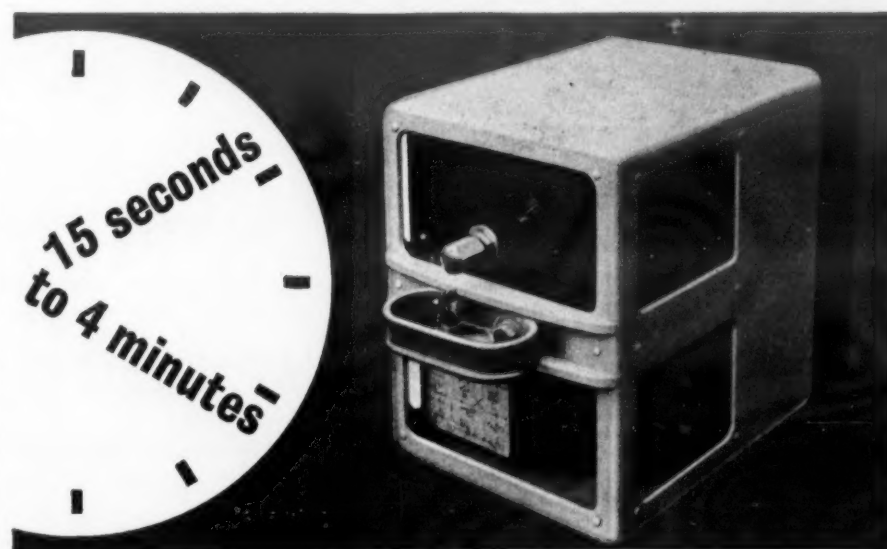


TRACTION DIVISION

BRUSH ELECTRICAL ENGINEERING CO. LTD. LOUGHBOROUGH, ENGLAND (A Member of the Hawker Siddley Group) B.T.19.



TYPE CT 500 D.C. TIME DELAY UNIT EXTERNALLY ADJUSTABLE



SPECIFICATION

Range 15 secs. to 4 mins.
Externally adjustable.
Accuracy 5%.
Virtually unaffected by voltage fluctuation
Automatically Resetting
Contacts: 6F Silver to Carbon.
4B Silver to Silver
Fully proved.

THE SIEMENS AND GENERAL ELECTRIC RAILWAY SIGNAL COMPANY LIMITED, EAST LANE, WEMBLEY

* No. 3 appeared September 10.

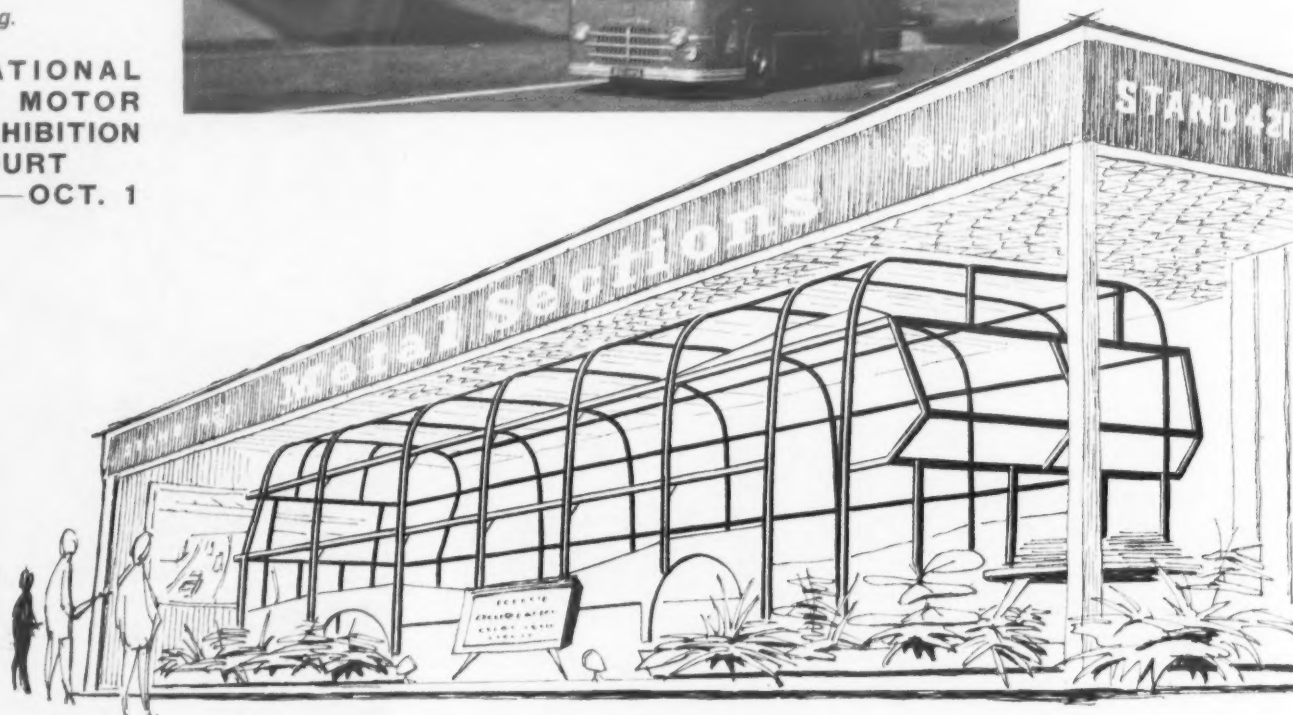
The M.1. Coach is on stand 421

A complete 'skeleton' of the M.1. Coach erected from Metsec lightweight all-metal framing sections is on view on **STAND 421**.

Specialists from this Division of Metal Sections Ltd., will staff the stand at all times and would welcome the opportunity to discuss your requirements with you.

Make a point of calling.

**20th INTERNATIONAL
COMMERCIAL MOTOR
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The commercial vehicle industry has waited years for this—the new Simms filter

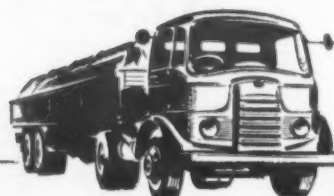
Its filtering efficiency is 98% down to particles as small as 2-4 microns

This is the highest efficiency of any commercial fuel filter made anywhere in the world

Particles below 5 microns are too small to be harmful, there is therefore no point in trying to remove them. All larger particles are removed completely, thus eliminating damage to fuel pump and injectors.

**STAND 225
EARLS COURT**
Simms

SIMMS MOTOR UNITS LTD., LONDON, N.2

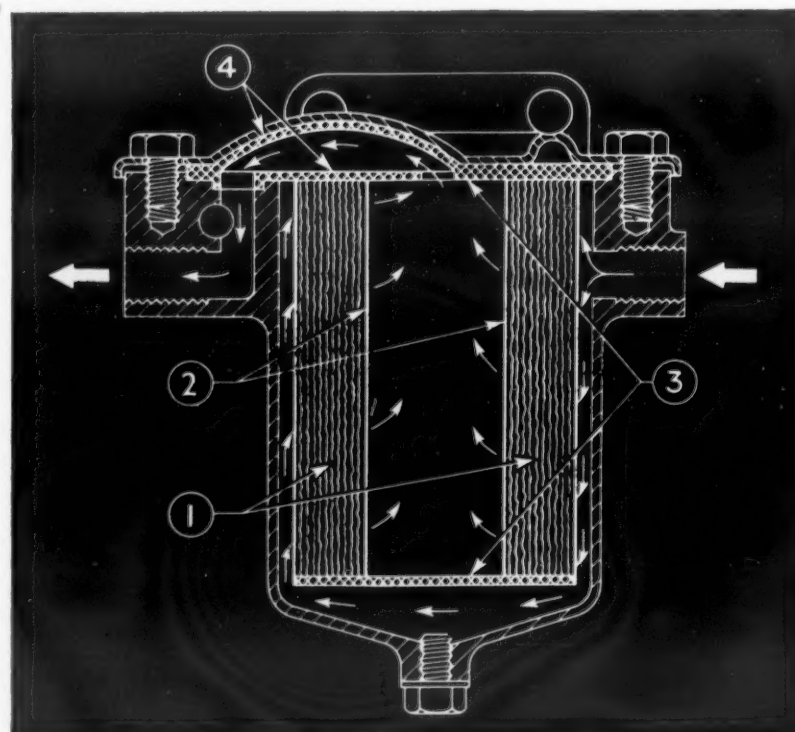


It is the simplest of filters to maintain

Look at these features:

- 1** Extra Large area, corrugated element giving long life.
- 2** Inward flow: clean side of element always faces inside.
- 3** Moulded ends completely protect all clean surfaces from dust.
- 4** Upper end of filter-element forms all seals. There are no loose bits to cause trouble on assembly.

Replacement of the element is so simple that it can be done by an unskilled operator with complete certainty that the filter will function properly.



STOP PRESS! The Simms Minimec — the mechanically governed Minipump — also makes its debut on Stand 225



PASSENGER VEHICLE CHASSIS

Stand-By-Stand Review

MORE REAR-MOUNTED ENGINES

MAIN point of interest as far as passenger vehicles are concerned on stand 80 is the new A.E.C. Regal Mark VI underfloor-engined single-deck chassis. Replacing the Regal IV as the company's high-capacity passenger chassis, the Mark VI is an entirely new vehicle and its introduction marks the completion of the new A.E.C. heavy vehicle range. The new chassis follows the general lines developed for the extremely successful Reliance and Export Reliance single-deckers in the medium-weight range, though the units are all new, including a robust spiral-bevel rear axle in place of the earlier Regal worm-drive unit.

The new power unit is a horizontal version of the

fitted with bonded-rubber bushes. Westinghouse compressed-air equipment operates the wheel brakes through individual cylinders and supplies air for door operation. The master controller is mounted under the driver's seat and contactor gear is carried at the extreme front end of the chassis frame, while the main resistance is fitted amidships between the chassis sidemembers. The ETB1 chassis has a wheelbase of 17 ft. 6 in. and an overall length of 31 ft. 4 in. B.U.T. also exhibits typical engine-transmission units for rail-car and small locomotive applications.

Apart from the numerous 8-, 12- and 14-seat passenger versions of the 4-ton forward-control van, the Commer Avenger passenger chassis can be seen on stand 33, where a Rootes two-stroke diesel-engined version, with Eaton two-speed axle, is shown by W. S. Yeates, Limited, fitted with the new Yeates 41-seat Fiesta luxury coach body. Another diesel-engined version of the chassis equipped with the alternative five-speed overdrive gearbox, also fitted with 41-seat coach bodywork, is available in the outside park for demonstration.

Rear-Engined Daimler

The new rear-engined Daimler Fleetline double-decker shown in both chassis and complete vehicle (M.C.W. body) form on stand 67 by Transport Vehicles (Daimler), Limited, is attracting wide interest for its achievement of 78 seats in conventional layout in an overall height of only 13 ft. 4 in. The Fleetline is shown with the Daimler diesel engine fitted, but in production form will have the Gardner 150-b.h.p. 6LX engine.

The engine is mounted, with fluid flywheel and four-speed Daimatic gearbox incorporating automatic or semi-automatic control, across the rear of the chassis in a demountable subframe. The gearbox incorporates a right-angle output shaft for coupling to the offset rear-axle drive. This feature and the use of drop-centre front axle and drop-centre double-reduction rear axle have brought the frame height down sufficiently to accommodate a 78-seat body with centre-gangway flat-floor layout coming within normal low-bridge overall height.

Other Daimler exhibits comprise a CVG 6LX 220 single-deck chassis suitable for 36 ft. by 8 ft. 2½ in. bodies; a CVG5 double-deck chassis, which is one of 60 now in course of delivery to Kowloon Motor Bus Company, Hong Kong; a Daimatic compound epicyclic gearbox; and the Daimler automatic brake-shoe adjuster.

Both Mark II and the new Mark III versions of the Dennis Loline double-decker, built by Dennis

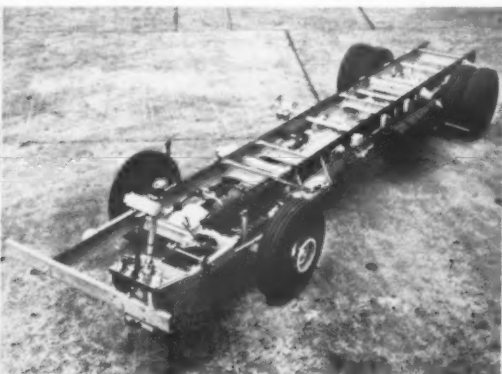
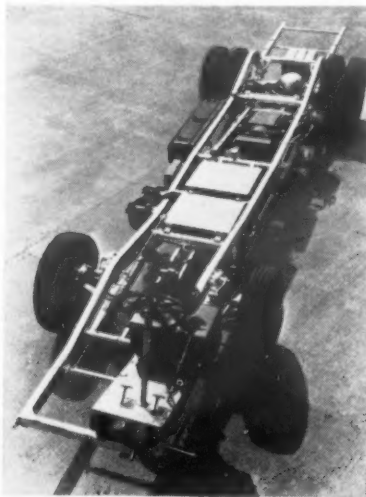


Guy Wulfrunian with disc brakes and air suspension all round—a Park Royal-bodied 72-seater for Bury appears on the Guy stand

A690 wet-liner direct-injection diesel engine, which develops 168 b.h.p. at 2,000 r.p.m. Transmission comprises a fluid flywheel and separately mounted Monocontrol or Automonocontrol four-speed epicyclic gearbox—the show chassis having the fully automatic equipment. Westinghouse air-pressure brakes are fitted and, with a wheelbase of 17 ft. 6 in. and overall length of 33 ft., the chassis kerb weight is 5 tons 4 cwt. The second passenger vehicle on the stand is an A.E.C.-Park Royal integral-construction RM-type double-decker, now in regular production for London Transport.

Taxicabs

The latest versions of Metropolitan-type taxicabs are shown by Beardmore Motors, Limited, on stand 61 and by Carbodies, Limited, on stand 31,



British United Traction ETB1 two-axle trolleybus chassis with A.E.I. traction equipment; above, the new A.E.C. Regal VI chassis is powered by the AH690 diesel engine with C.A.V. DPA distributor fuel-injection pump

where the Austin FX4 is on view. The Beardmore Mark 7 taxi can be powered by either the Perkins Four 99 43-b.h.p. diesel engine or the Ford four-cylinder 59-b.h.p. petrol engine, driving through a three-speed gearbox and hypoid rear axle. The coachbuilt body, which provides a full-length partition on the driver's left, a tinted rear glass and "for hire" sign in the roof, is panelled in aluminium and plastics. The Austin FX4 taxi incorporates the B.M.C. 2.2-litre diesel engine, a Borg-Warner automatic transmission and independent front suspension.

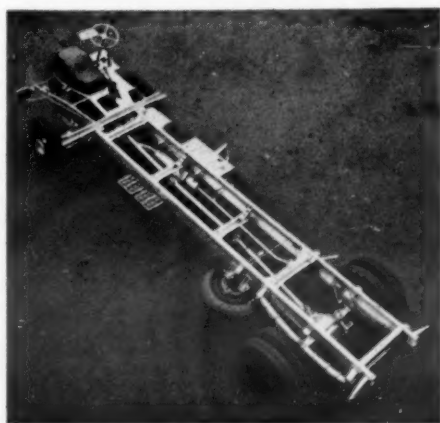
Bedford passenger vehicles are this year shown only on bodybuilders' stands. Apart from the various passenger-carrying modifications of the light van, Duple companies show a 15-seat coach body on a modified Bedford 3-ton chassis and a 37-seat Super Vega coach on the Bedford passenger chassis on stands 35 and 36, while Plaxtons on stand 34 shows a 41-seat Embassy coach on a passenger chassis. In the demonstration park, Bedford passenger chassis form the basis of a 41-seat Duple Super Vega coach and a Duple 42-seat service bus as well as a 41-seat Plaxtons Embassy coach and a 41-seat Burlingham coach, while a Duple (Midland) 23-seat export bus is shown on a normal-control 3-ton chassis.

Lone Trolleybus

The sole trolleybus chassis exhibited is a B.U.T. Type ETB1 two-axle vehicle shown by British United Traction, Limited, on stand 65. The chassis has alloy-steel channel-section frame sidemembers, upswep over both axles, braced by six tubular and one channel-section crossmembers. The A.E.I. Type 209 traction motor is positioned ahead of the front axle on four resilient mountings and transmission is through a large-diameter tubular propeller shaft, with needle-roller-bearing universal joints, to an underslung worm-drive fully floating rear axle.

Long semi-elliptic springs are controlled by Girling hydraulic dampers and all spring eyes are

Bros., Limited, under Bristol Commercial Vehicles licence, are on view on stand 57. As is now well known, the Loline design, which includes a side transmission line and drop-centre double-reduction rear axle, permits the fitting of a central-gangway flat-floor double-deck body of normal low-bridge height. The Mark II on show is powered by a Leyland O600 diesel engine, derated to give 115 b.h.p.

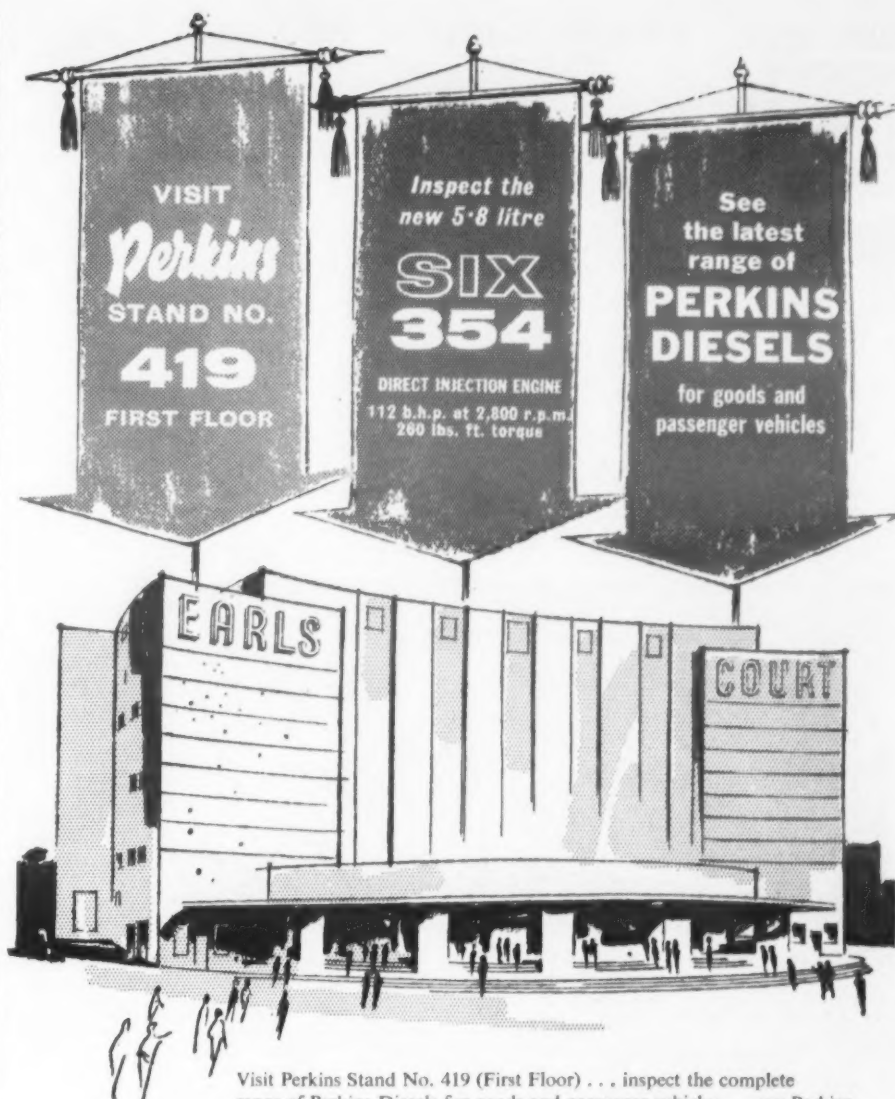


Ford Thames passenger chassis

at 1,800 r.p.m., driving through a four-speed constant-mesh gearbox. It has leaf-air suspension of the back axle and air-pressure brakes. It is fitted with East Lancashire Coachbuilders 27 ft. 8 in. by 8 ft. 63-seat body incorporating a forward entrance with single 15-in. platform step.

The Mark III Loline provides a more adaptable

(Continued on page 42)



Visit Perkins Stand No. 419 (First Floor) . . . inspect the complete range of Perkins Diesels for goods and passenger vehicles . . . see Perkins Diesels on Manufacturers' stands throughout the exhibition . . . and, above all, see the new Perkins Six 354—the ideal engine for the modern vehicle fleet. Operators and the press endorse the Six 354 as the finest vehicle engine of its class and horsepower in the World.

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A good show of GUY's

REPEAT ORDERS
at EARLS COURT
STAND No. 55



'Victory' for Lagos Municipality

GUY MOTORS LIMITED WOLVERHAMPTON



'Invincible' for Wynn's



'Warrior' for Tate & Lyle



'Wulfrunian' for West Riding



'Warrior' for Miers Transport Ltd.



'Invincible' for Regent Oil



Goods Chassis at Earls Court

(Continued from page 3)

354-cu. in. diesel-powered 8-ton capacity chassis fitted, one with a refrigerated body and others as 7-ton tippers.

E.R.F. Line-up

Seven representative examples from its current range of heavy-duty vehicles are shown on stand 66 by E.R.F., Limited, from the two-axle 44G for 13 tons gross up to a 28-ton gross export eight-wheeler, while a further five are exhibited on coach-builders' stands. A noteworthy feature of all E.R.F. chassis is grouped chassis lubrication. The 44G on the manufacturer's stand is interesting for its special tipping tanker body—the Bonalack Pneumajector for bulk carriage and blown discharge of cement with a capacity of 290 cu. ft. (9 tons). Technical specification includes Gardner 4LW engine, five-speed constant-mesh gearbox, two-speed rear axle and Hydrovac vacuum servo-hydraulic brakes. Other exhibits comprise a standard 5LW-powered 54G four-wheeler with 22-ft.

entirely new braking system for the Trader range from 5 to 7 tons capacity, which now employs the Clayton Dewandre Hydrovac vacuum servo-hydraulic equipment. This is a constant-vacuum system, which cuts down the time lag between pedal operation and brake response and demands lower pedal pressures generally. The system gives two stages of assistance, the more powerful servo action coming into effect when pedal pressure exceeds a predetermined level. Brake lining areas on the 5- and 7-ton chassis have also been increased—to 436 sq. in. and 480 sq. in. respectively.

All vehicles on the stand are strikingly finished in white and blue and two from the heavy end of the Trader range form special exhibits. One is an articulated tractor designed to take Taskers fifth-wheel or Scammell automatic coupling and half of each type of coupling is fitted, with a mirror placed vertically between to permit the layout of both types of coupling to be viewed. The second special exhibit is a 160-in. wheelbase seven-tonner with sectioned engine, transmission and steering, mounted on a rotating stand, and the display is completed with 7-cwt. van, goods and passenger

unblown engine for insignificant increases in bulk and weight, still further reducing the specific weight and bulk of the two-stroke engine.

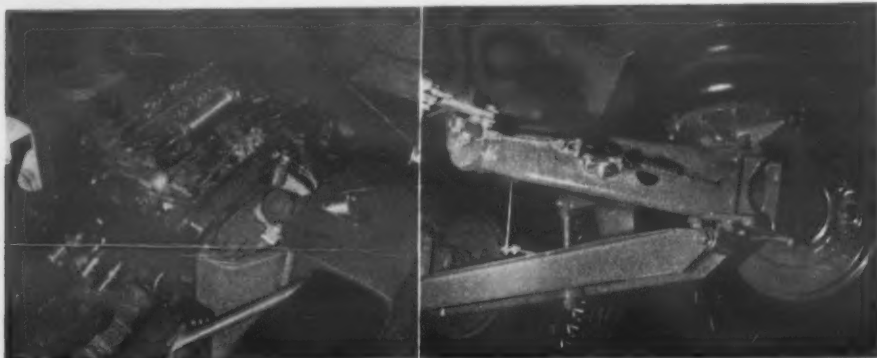
The Foden high-quality heavy-duty range is well represented on the stand by one two-axle and three four-axle maximum-weight vehicles for the home market, all Gardner powered and with transmissions ranging from five to 12 gears, and by a three-axle export chassis embodying the Cummins 212-b.h.p. diesel engine and 12-speed constant-

Beaver and Octopus four- and eight-wheelers shown by Leyland Motors, Limited, from its new 14 to 24 tons gross range and a higher-powered Super Comet. These new chassis featuring Power-Plus diesel engines are also much in evidence on body-builders' stands and in the demonstration park. The new Leyland heavy-duty range developed for service both at home and overseas sets the pattern for the next 10 years or so in meeting the requirements of high-speed heavy-duty trunk operation.

Leyland Power-Plus

Principal features are diesel engines providing significantly higher powers and improved economy and life, wide-range transmissions with up to seven speeds in a standard casing, non-reactive bogie suspension for multi-wheelers and improvements in driver wellbeing in the form of easier cab access and improved visibility and power servos to reduce the physical effort required for many driving tasks.

The Power-Plus diesel engine range has been



Horizontal Gardner 6HLX engine mounting in the new Scammell Trunker and, right, air suspension (Firestone units) of the matched semi-trailer

body for 14 tons gross; a 6LX-powered four-wheeled articulated tractor for 24 tons with semi-trailer; a three-axle tipper for 20 tons gross; two 68G 24-ton gross eight-wheelers, one with a standard 24-ft. platform body and one with Onazote-insulated stainless-steel pressure tank, both Gardner 6LX powered, and a 68RA export four-axle tipper for 28 tons gross solo and 50 tons with trailer. Technical features include 200-b.h.p. Rolls-Royce diesel engine, five-speed constant-mesh main and two-speed epicyclic auxiliary gearboxes, double-drive bogie with lockable interaxle differential and Westinghouse diaphragm-operated air pressure brakes.

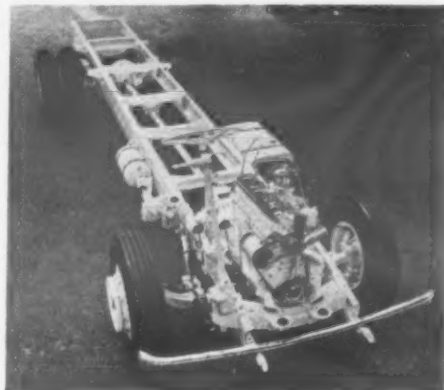
Thames Presentation

Ford Motor Co., Limited, has nine vehicles from the comprehensive Thames range on stand 92 and numerous examples are scattered throughout the exhibition on stands of bodybuilders and equipment manufacturers. A point of interest is an

versions of the 15-cwt. forward-control van, a normal-control 4-ton lorry, a 5-ton forward-control Trader with special low frame and 7-ton Trader lorry with two-speed axle and 6-cu. yd. Edbro dropside tipper.

Turbocharged Foden Two-Stroke

The main points of attraction on stand 78, occupied by Fodens, Limited, are the turbocharged two-stroke diesel engine forming the new power unit of the established FED6 heavy-duty dumper for 30 tons gross weight and the latest version of the Foden resin-glass cab, in both home and insulated tropical form, which is now rapidly outpacing the metal cab in popularity with operators. The Mark IV six-cylinder diesel engine embodies a C.A.V. turbocharger and an intercooler for mounting ahead of the normal vehicle radiator; specially matched for heavy dumper duty, it provides roundly a 30 per cent increase in maximum b.h.p. and a 50 per cent increase in peak torque over the



The new Dodge forward-control chassis for 14 tons gross weight

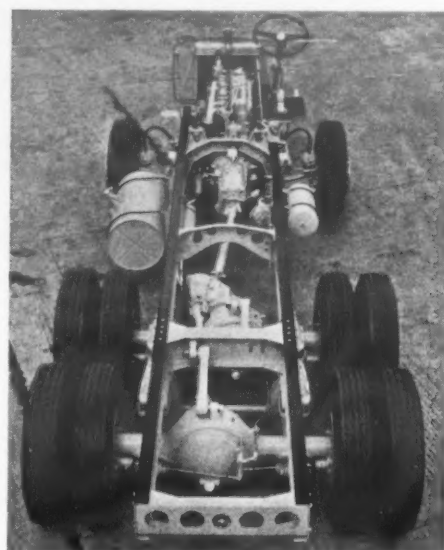
mesh epicyclic transmission. Though not outwardly visible, Foden vehicles have been subject to extensive detail development since the last exhibition which has resulted in an overall 15 per cent improvement in operating economy.

Rolls-Royce-Powered Guy

Goods vehicles shown by Guy Motors, Limited, on stand 55 comprise two from the Warrior medium-weight range and home and export examples from the heavy-duty Invincible range, while both ranges are featured also on the stands of seven bodybuilders and are available, with an Otter, for outside demonstrations. A feature of both Invincibles on the manufacturer's stand—a double-drive six-wheeler powered by Gardner 6LX engine and an export eight-wheeler—is the use of a limited-slip interaxle differential. Mechanical features of the export vehicle include a Rolls-Royce C6NF diesel engine, developing 210 b.h.p. at 2,100 r.p.m. and 570 lb./ft. torque at 1,300 r.p.m., six-speed constant-mesh gearbox and dual-circuit air-pressure brakes operating on all four axles.

An interesting study in German light-van design is seen on stand 82, occupied by Hans Glas G.m.b.H., in care of its British concessionaire, Goggomobil, Limited. The little TL 300 or 400 5-cwt. van, having a twin two-stroke air-cooled engine at the rear and providing 56 cu. ft. of load space is already established in this country, but a 6-cwt. capacity pick-up of similar basic construction seen on the stand is comparatively new, as is also the synchromesh gearbox now available in place of the electric preselector transmission. Also new is the 7½-cwt. K700 van, which has a front-mounted twin-cylinder air-cooled four-stroke engine and all-synchromesh four-speed gearbox.

Highlights of stand 70 are the entirely new



The A.E.C. Marshal for 20 tons gross weight

extended to cover also the medium-weight Leylands and the Super Comet on show is so equipped, as also are two vehicles of the Albion range. Design of the new engines follows traditional lines in general, but intensive research and development have led to the new Spheroidal form of toroidal combustion chamber and improved breathing and combustion characteristics generally, providing an overall gain in efficiency of more than 30 per cent. The gain has been employed to provide alternative power units in the heavy-duty range, yielding outstanding economy or exceptional power.

An opportunity to study the products of West German manufacturers in the heavy-duty field is provided on stand 64, where Klöckner-Humboldt-Deutz A.G. shows Magirus-Deutz vehicles, and stand 60, which carries three examples from the comprehensive Mercedes-Benz range, shown by Mercedes-Benz (Great Britain), Limited. Both

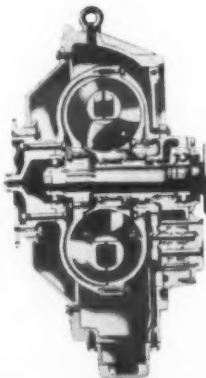
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TRANSMISSIONS FOR ROAD TRANSPORT

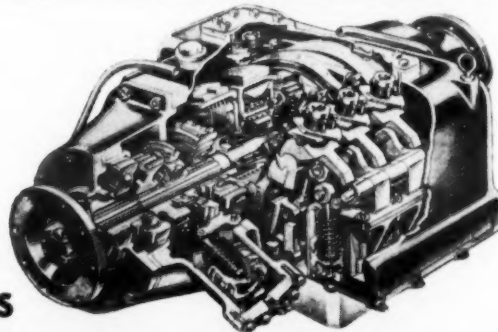


Our Automatic Gearbox
in service with London Transport
on the Green Line "Routemaster".

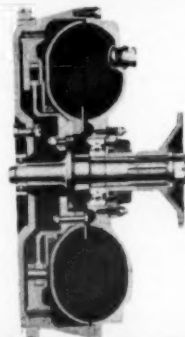
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GEARBOXES



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VISIT OUR STAND No. 402 1st FLOOR
OR WRITE TO THE 'TRANSMISSION SPECIALISTS'
FOR DETAILS OF OUR PRODUCTS

SELF-CHANGING GEARS LTD.

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ZURICH ROLLING STOCK

Large Capacity Units Help to Peg Fares

IN pursuance of a policy which progressively replaces small and uneconomic units on its tram and bus routes Zürich, Switzerland's largest city, is this year introducing rolling stock of an entirely new pattern. In 1939 Zürich began replacing old two-axle metre-gauge tramcars by the large-capacity bogie units of the type and layout which has since become widely used on all Swiss tramway systems. This move enabled Zürich to hold fares at a constant level and to make increases unnecessary for over 20 years.

Wages and personnel expenses amount to over 75 per cent of the undertaking's total operating costs and the fact that it has been possible to increase the carrying capacity per unit from an average of 49.7 persons in 1938 to 78.4 in 1958 has been of immense importance in pegging costs. Although the total number of passengers carried annually has now risen by 125 per cent over the 1938 figure, the greater carrying capacity of the modern units on both tram and bus services has made it possible for the operator to handle this traffic with a car mileage increase of only 44 per cent.

Staff Aspect

The introduction of trams and buses each carrying a nominal 100 passengers has of course made high demands on the operating staff and the entirely satisfactory way in which vehicle crews have come to accept the high-density crush-loader was acknowledged by the Zürich undertaking in a recent report with much appreciation.

The current rolling stock programme comprises a total of 33 units, of which 15 motor cars and

other features. In addition to the usual electric under-seat heaters use is now made of the heat dissipated by the roof-mounted starting and braking resistances by means of air ducts and blowers which are arranged to effect a complete change of air 12 times an hour. The conductor's seat has been raised about 6 in. to provide a better view of the car interior.

High Horsepower

Each axle in the two bogies is motored. Total output is 340 h.p., a high rating necessitated by severe grades on some routes of the Zürich system. The electrical and control gear was supplied by Maschinenfabrik Oerlikon. Trailer dimensions and layout follow that of the motor cars. Electro-magnetic railbrakes are now provided on trailers.

Of the remaining tramway rolling stock ordered by Zürich the first prototype two-car articulated set was demonstrated recently. This incorporates many of the mechanical and body details of the new series 1416 cars described above, but differs of course in the overall length (66 ft.) and in the carrying capacity. The articulated set can carry a total of 160 passengers, of whom 44 will be seated.

All six axles are provided with traction motors and the unladen weight of the unit which was built at a cost of S.Fr.500,000 is 36 tonnes. A trailer, used during the peak hours only, brings the capacity between 270 and 300 passengers. Yet another prototype articulated unit is nearing completion at the Neuhausen works of the Schweizer Industrie Gesellschaft (S.I.G.). This has Brown



New Schlieren tram No. 1416 for Zürich with new trailer



One of the Zürich articulated Saurer buses, the result of five years' experience

15 trailers are now in course of delivery. They will go in service on route No. 14 from which the old four-wheelers will then be withdrawn. In appearance the new cars are generally similar to the earlier p.a.y.e.-bogie units with the exception that the V-front and rear ends have been modified in such a way that all doors are now in the straight body side. This arrangement facilitates easier and safer boarding and alighting.

Motor Cars

The motor cars, built by the Swiss Carriage and Lift Works, Schlieren, at a cost of S.Fr.310,000

Boveri electrical equipment and is intended for intensive trials on a number of different routes.

NEW ZÜRICH TRAMS: PRINCIPAL DIMENSIONS

	Series 1416 motor car	Series 1701 articulated tram
Gauge	1,000 mm.	1,000 mm.
Overall length .. .	45 ft. 8 in.	66 ft.
Overall width .. .	7 ft. 2 in.	7 ft. 2 in.
Bogie wheelbase .. .	5 ft. 10 in.	5 ft. 10 in.
Centre bogie wheelbase .. .	—	6 ft. 6 in.
Bogie centres .. .	20 ft. 4 in.	20 ft. 4 in.
Total seats .. .	28	44
Standees .. .	77	116

The design of this set is slightly different from the



Schlieren three-axle trolleybus on trial in Zürich

(over £25,000) each, have an overall length of 45 ft. 8 in. and an overall width of 7 ft. 2 in. There are 28 seats in each car and space for 77 standing passengers. The plastics shaped seats have a tubular steel frame. The body is of steel-framed construction and has panels which are easily replaced in case of damage. They are treated with a special anti-drumming compound which also prevents corrosion. The rear (entrance) door is 4 ft. wide and has a grab rail which can be swung out of the way to permit the loading of invalid wheel chairs on to the rear platform.

High intensity fluorescent lighting and Pirelli rubber flooring with a special surface texture are

unit described above in that a third, short section has been inserted between the two cars.

Zürich has always encouraged builders of the unorthodox vehicle and brief reference was made in MODERN TRANSPORT at the time of its introduction, in 1959, to a large capacity single-deck bus with the driver's seat raised above the front of the vehicle. This experiment has proved successful and at least 10 more vehicles of this type are to be acquired. Articulated buses have been in service since 1955 when Saurer built the first of two rear-engined crush-loaders. Finally there are 27 articulated trolleybuses in service or in course of delivery.



113 Motor Coach Sets for South African Railways

A new AEI contract covers the electrical equipment for 113 motor coaches, 60 driving trailers and 276 trailer coaches for South African Railways. A total of 350 motor coach equipments have now been ordered from AEI by S.A.R., and no fewer than 345 electric locomotives have been ordered from AEI by the same customer.

For further information apply to your local AEI Office or to AEI Traction Division, Trafford Park, Manchester 17



Traction Division

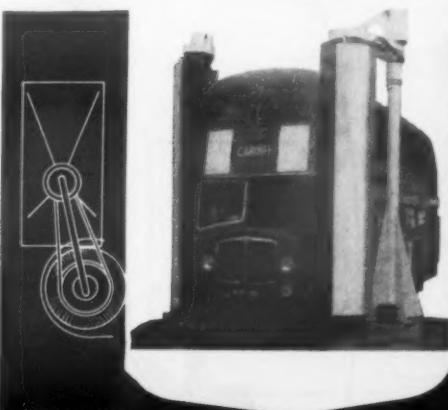
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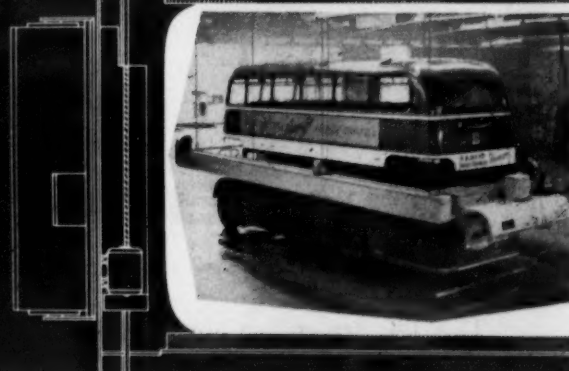


VERTICAL DRIVE-THROUGH

The Widney Vertical Washer is of the drive-through type, suitable for either single or double deck buses. Swinging arms ensure that the rotating brushes follow the contour of the sides, irrespective of vehicle widths. Water jets operating from either side, loosen mud and dust which is removed by the brushes — a final jet acts as a rinser.

HORIZONTAL

The Widney Horizontal Washer is suspended from the roof and therefore occupies no valuable floor space. Robustly constructed and designed from practical experience, it automatically adjusts itself to varying vehicle widths and can wash roof, sides and rear panels in 3 minutes.



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VEHICLE WASHING MACHINES

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The engine is housed in an entirely separate compartment at the rear of the TK cab. No fumes, no noise, no heat.

New Bedford Triple Safety Brakes

The TK driver can always rely on safe brakes. Every feature of the powerful foot brake system is duplicated for safety.

Direct connection between pedal and hydraulic system. Powerful air-pressure servo assistance with built-in reservoir on diesel-engined models — vacuum servo for petrol-engined models.

Double safety master cylinder. Extra thick drums to resist fade.

As a *triple* safeguard Bedford introduces an entirely new hand-operated transmission brake. This is a man-sized brake which will halt a fully laden truck from maximum speed three times in succession without loss of efficiency.

There's never been a truck like the amazing new BEDFORD

Here is real money-saving news for all truck operators—a completely new range of forward control Bedfords destined to set new standards of design and efficiency throughout the transport world. The TK Bedfords introduce an inspired new approach to forward control. Cab *ahead* of engine. All the advantages of forward control with none of the drawbacks. Maximum body length in relation to wheelbase; better manoeuvrability; ideal weight distribution; excellent all-round vision; wonderful *forward* vision.

The easy-entry TK cab has a flat, walk-through floor and plenty of room for a crew of three. The engine, mounted in an upright position, is in a separate compartment. It is easily reached through hinged side flaps. Accessibility is outstanding.

With the famous TJ normal control models, Bedford offers the most comprehensive truck range and the best value in the business—the right vehicle at the right price for every load from 25 cwt. to 12 tons. Your Bedford dealer will be glad to arrange a demonstration.

**PROVED BY FOUR YEARS
OF WORLD-WIDE TOUGH TESTING**

65 YEARS OF COMMERCIAL VEHICLE PRODUCTION

Thornycroft Emphasis on Heavy Duty Types

WITH the centenary year of its parent company only four years away, Transport Equipment (Thornycroft), Limited, the road vehicle department of John I. Thornycroft and Co., Limited, can itself look back with justifiable pride on a history of endeavour and achievement as old as the British motor industry itself. In fact, the first Thornycroft commercial vehicle—a steam-powered laundry van, which is still preserved in running order at the company's Basingstoke works—was completed and running some months before the repeal of the so-called Red Flag Act in November, 1896. It was thus among the very first self-propelled goods-carrying vehicles conceived as such in the world.

The Thornycroft family business was established in Chiswick in 1864 on successful designs of a water-tube boiler and a lightweight steam engine, the efficiency of which combination was roundly demonstrated in the steam yacht *Miranda*, which in 1871 achieved the remarkable speed of 18 knots, whereafter came worldwide recognition and esteem for Thornycroft marine propulsion equipment. It was this early experience in developing efficient

sprockets. Power was derived from an adapted vertical launch engine and marine water-tube boiler. As a result of promising road trials of the van and its exhibition at a Crystal Palace show in 1896, a keen interest brought numerous inquiries and led to the introduction in 1897 of a steam tipping wagon, initially developed for Chiswick Urban District Council, incorporating an opposed-piston compound steam engine and chain drive to a differential rear axle. A further advance was made in 1898, the year in which the Basingstoke works was opened specifically for manufacture of commercial road vehicles, with a 4-ton capacity steam van employing central stoking of the water-tube boiler, giving lower centre of gravity, and compact side-by-side compound engine. This vehicle, as a short-wheelbase tractor with semi-trailer attachment—probably the world's first articulated lorry—won a premier award in trials organised in 1898 by the Liverpool Self-Propelled Traffic Association.

Thornycroft steam-powered vehicles were produced and sold in large numbers for the day and many connections with operators, both at home



Dramatic moment in loading a Mighty Antar Oilfield lorry as the full weight of the winch-hauled skid comes over the tail roller

of services spokesmen, if not generally so publicly.

While production of steam-engined vehicles was continued at Basingstoke for some years—steam buses were in operation in Burma in 1900 and London in 1902 and a steam lorry specially developed for overseas service was introduced in 1902—military influence first led the company away from steam to the internal-combustion engine

The new J and K type Thornycroft commercial vehicles introduced in 1912 employed shaft drive to a live back axle for the first time, the J type having a worm-drive unit and the K type a massive double-reduction axle in a cast-steel housing developed to meet a specification for a military lorry qualifying for War Office subsidy. In the event, when war and the need for large numbers



Evolution: No. 1 steam van of 1896, with the company's founder, Sir John I. Thornycroft, on the left and its present head, Sir John E. Thornycroft, at the controls; a group of 1897 steam tipping wagons supplied to Westminster City Council; a petrol-engined chain-drive 2½-ton van delivered in 1910; and one of the famous J-type lorries seen on a "Modern Transport" sortie from the Basingstoke Works, where it is preserved after 27 years' service with a brewery company

lightweight boilers and engines that enabled the company to produce commercially acceptable steam wagons for industrial purposes at a time when petrol engines were still extremely unreliable and scarcely existed in powers sufficient to haul a useful payload.

Early Articulated Lorry

Thornycroft road vehicle design advanced rapidly after the first van, which was little more than a conventional horse cart turned back to front, with its large iron-shod wooden wheels at the front driven through block-type chains and

and in various overseas countries, that have survived through to the present were made with steam tractors, lorries and buses around the turn of the century. One of these early links, though not with a civilian operator but with the military, was forged in 1899, when Thornycroft supplied a fleet of steam lorries for service with the British forces in the Boer War. Of the various makes of mechanical transport vehicles used in that campaign, Lord Kitchener subsequently remarked: "The motor lorries sent to South Africa did well; Thornycrofts are the best"—a high recommendation that has been echoed by successive generations

for road vehicles. The first Thornycroft motor vehicles were paraffin-engined tractors and lorries developed for the War Office, while the first petrol-engined Thornycroft—a 4-ton capacity lorry—appeared in 1902 and was followed into production in 1903 by lorries for 30-cwt. and 2-ton loads and in 1904 by passenger vehicles based on the goods chassis. A range of high-quality private cars introduced in 1903 earned an enviable reputation and continued in production until 1912, when the rising demand for commercial vehicles brought the decision to concentrate on production of these and drop the cars.

of motor vehicles came a year or so later, it was the J type that was selected for large-scale production, over 5,000 being supplied to the services during the war of 1914-18. In the civil field prior to the outbreak of war, the J type was available with 34-seat double-deck bodywork and the K type as a 30-seat charabanc as well as with goods bodies of about 4 tons capacity.

Successful J Type

After the war, many hundreds of the J-type lorries were recovered and reconditioned for civilian service in both goods and passenger form

JUST OFF THE BOAT!

(and B.R.S. get them to the shops in 24 hours)



B.R.S. Southampton senior traffic clerk stage-manages Operation Grapevine.



While B.R.S. driver helps with loading, agents are arranging to market fruit throughout country. There is no time to be lost.



The grapes will be in eleven wholesale markets in England and Wales by morning.



B.R.S. depots are briefed by teleprinter to ensure smooth delivery.

Operation Grapevine rushes cargo overnight to market

Operation Grapevine is a scheduled service happening every day, every week—but it's never the same two days running! Only a nationwide organisation like British Road

Services could cope with it. If you have a complicated delivery schedule, get in touch with British Road Services. They've got this sort of thing taped.

TO GET THINGS MOVING

—GET B.R.S. (they're in the 'phone book)

and the type proved so successful that it continued in production at Basingstoke until 1924, when the range was widened to embrace chassis with payloads from 2 to 6 tons, with equivalent passenger versions, powered by new 30-h.p. and 50-h.p. petrol engines. Greater concentration on the needs of specialised transport operators, for which the company has become noted, started at about this time, the heavier vehicles in the 1924 range being offered with such ancillary fittings as power-operated winches, cranes and so on for a variety of purposes. Vehicles in the new range were also notable for being available as short-wheelbase tractors offered complete with semi-trailers for up to about 11-ton payloads.

Thornycroft high-powered tractors and cross-country vehicles have also gained a high reputation and much of the modern successes with Antar, Big Ben and Nubian can be attributed to the company's early experience in these fields. The Hathi tractor developed for the War Office and intro-

not been confined to this one instance. During and after the 1914-18 war a number of J-type vehicles was adapted to run on producer gas, one such having won an award in French Government trials of vehicles capable of operating satisfactorily on fuels other than petrol. Development of the new diesel engines was sufficiently advanced for an efficient four-cylinder unit to be offered in production vehicles in 1933, followed by a six-cylinder diesel of 123 b.h.p. soon afterwards. Both ante-chamber engine, they were superseded after a year or so by direct-injection units, many of which saw war service, laying the foundations of the present-day line of economical and reliable Thornycroft automotive and marine diesels.

Successful Turbocharging

Turbocharging of automotive diesel engines is a field in which Thornycroft has been well to the fore in this country. The KRN 6S 11.3-litre engine of 209 b.h.p. went into production in 1954 and was



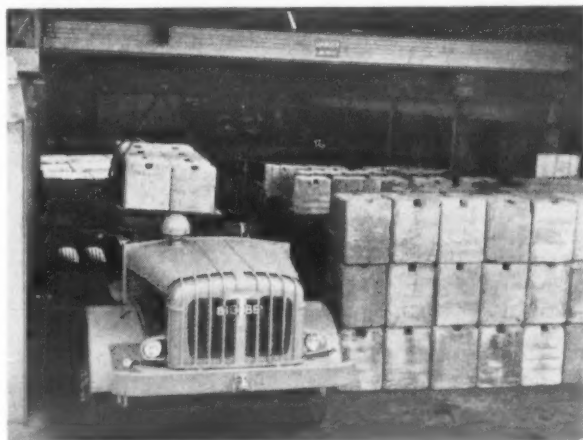
Special Thornycroft passenger vehicles: a 60-seat diesel-engined railcar supplied to Poland in 1935 and, right, the Trusty-powered Mulliners desert bus mentioned in the text seen in M.I.R.A. dust-tunnel tests

duced in 1925 was a remarkable vehicle for its day, excellent cross-country and gradient performance hauling a 10-ton load being imparted by a 100-h.p. engine, dual-range transmission and four-wheel drive. The first Thornycroft rigid six-wheeler, the A3 type, incorporating worm drive to both rear axles and a patented fully articulating bogie, appeared in 1926. Although it was primarily designed to meet a military specification, it found ready acceptance for civilian purposes in many different parts of the world for off-road transport and founded the line of rugged dependable special-purpose vehicles that has led progressively to the present-day range.

Notable Off-Road Vehicles

Notable among Thornycroft off-road vehicles of the recent past have been the military four-wheel-drive Nubian, which formed a major proportion of the 13,000 wheeled vehicles supplied to the services during the recent war and which now has a high-performance six-wheel-drive stable companion, and the six-by-four Amazon—forerunner of the current Big Ben—which enjoyed a major success, as a passenger vehicle as well as a tractor and load carrier, in many countries lacking good roads. South African Railways alone took about 350 of the type for goods and passenger carrying while others went in quantity to oil companies in South America and the Middle East.

The Amazon continued in production until 1951 and many are still in service. Perhaps rather deficient in brakes judged by modern standards, a new lease of life was accorded early in 1949 when Thornycroft introduced its own design of obturator, or exhaust brake, for both diesel and petrol-engined vehicles. The hand-operated diesel-engine exhaust brake incorporated an ingenious mechanical fuel cut-off, while the petrol-engine unit was cleverly designed to overcome the two major problems—destroying vacuum in the manifold and introducing large volumes of air quickly to provide maximum cylinder pressure and preventing the high temperature of the petrol-engine exhaust gases from destroying the obturator valve. The engine in question was the 11.3-litre twin-carburettor Thornycroft unit; the exhaust brake version was fitted with two separate tubular induction manifolds the open ends of which were normally sealed by flap valves. These were coupled mechanically to open when the exhaust brake was used. The obturator butterfly valve was posi-



A Big Ben being loaded with 9 tons (half its total test load) in the store, which has a stock of about 300 tons of test loads

Unlike many other Thornycroft special-purpose vehicles, it was not developed to meet a military specification but for Iraq Petroleum Company, which placed an initial order for 35 of these giants. Nevertheless, military authorities were quick to appreciate the merits of the Antar, which has become the standard tank-transporter tractor in the armies of a number of countries.

Design and development of the Antar at Basingstoke was something of a record. The initial order was placed by I.P.C., which required the vehicles for work in connection with pipeline construction in the Arabian desert, in March, 1949, the first completed chassis ran in the following December



An export Trident undeterred by soft mud and, right, a Big Ben climbing a 1 in 3 loose-surfaced slope at 32 tons gross, both on "Modern Transport" tests

tioned well away from the manifold to avoid temperature effects. It had an operating pressure of 20 to 28 p.s.i. compared with 35 to 40 p.s.i. for the diesel-engine unit.

Pioneering Work On Engines

It was the South African order for Big Ben type chassis, which called for greater power than was then standard in the type, that led the company into early experiments with petrol injection in 1946 and 1947. An engine of 150 h.p. was called for and the engine selected for experiment was the NR6 7.88-litre diesel, normally producing 100 b.h.p. at 1,750 r.p.m. and a maximum of about 320 lb./ft. torque. Converted to run as a petrol-injection unit, with special cylinder heads and injection into the manifolds through low-pressure nozzles, the engine was successfully worked up to 150 b.h.p. as required and a peak torque output of 450 lb./ft. In the event, the order was completed with the then new 11.3-litre carburettor petrol engine, which had ample power to meet the specification.

Pioneering Thornycroft ventures in engines have

Military Amphibian

When the need for a military amphibian arose early in the 1939-45 war, Thornycroft, with its unique experience in building off-road vehicles and marine craft, was the obvious recipient of a design and development contract. The result was the Terrapin, a shoregoing vessel rather than a seagoing vehicle, which was capable of carrying 5-ton loads on water at 6 m.p.h., over soft sand and shingle and on the road at up to 40 m.p.h. Terrapin I, which advanced from drawing board to prototype stage in only 12 weeks, had two Ford V-8 petrol engines, each of which drove four wheels on each side. Steering on land was achieved by differential control of the engines. Terrapin I went into series production at the Morris Commercial works, while Thornycroft went on with the design of an even

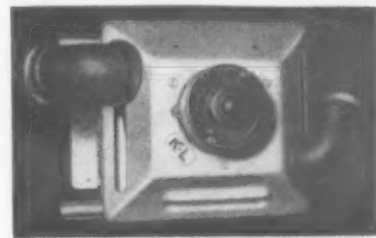
(Continued on page 46)



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B.M.C. ADDITIONS

New 10-12 Cwt. Vans

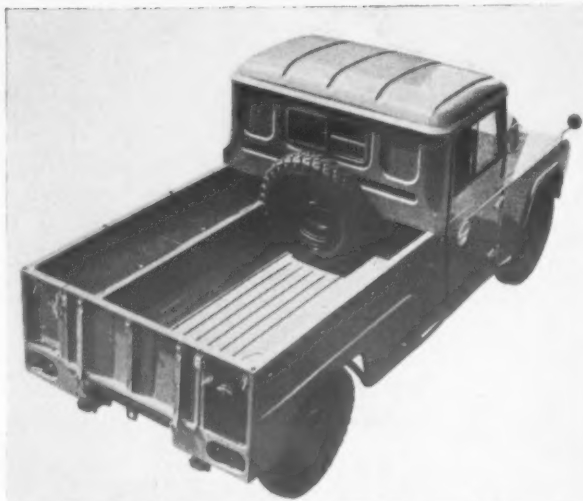
LONG-WHEELBASE AUSTIN GIPSY

CHANGES in the British Motor Corporation ranges of commercial vehicles, to be seen on Austin, Morris and Morris Commercial stands at Earls Court, include the introduction of two new vehicles and an additional version of the Series 702 7-ton capacity goods vehicle, while the recently introduced 5-cwt. Austin Seven and Morris Mini-Van will also be on public view for the first time. The new vehicles are a 10-12 cwt. van range, which

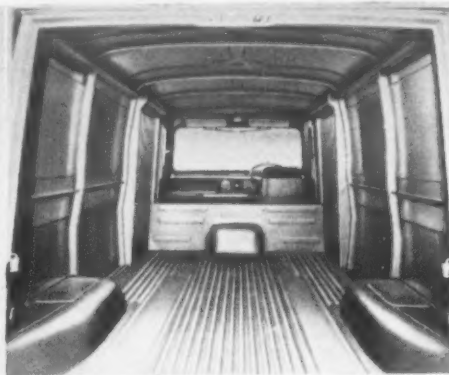
emerged from a three-year testing and development period, are also priced competitively at £2470. The design incorporates well-established B.M.C. components—engine, gearbox, rear axle, brakes and suspension—all of which are used in other current Austin and Morris car and van designs. The B-series 1,489-c.c. petrol engine, developing 42 b.h.p. at 4,000 r.p.m., is identical to that fitted to the Omnivan and J2 range of vehicles. In the

control lever, which protrudes vertically from the cab floor beside the driver's left knee. The three-quarter-floating hypoid rear axle is similarly of proven design; it has a final drive ratio of 4.870 to 1. The combination in early production vehicles has provided the performance figures reproduced in the accompanying table in company tests.

10-12 cwt. Test Data
WEIGHT LADEN AS TESTED:
 32.5 cwt.—11 cwt. payload.
MAX. SPEED—55 m.p.h.
STEADY SPEED CONSUMPTION:
 30 m.p.g. at a constant 20 m.p.h.
 29 m.p.g. at a constant 30 m.p.h.
 28 m.p.g. at a constant 40 m.p.h.
 22 m.p.g. at a constant 50 m.p.h.
Overall consumption—28 m.p.g.
ACCELERATION IN TOP GEAR:
 10-20 m.p.h.—9.0 sec.
 10-30 m.p.h.—18.0 sec.
ACCELERATION THROUGH GEARS:
 0-30 m.p.h.—11.5 sec.
 0-40 m.p.h.—17.0 sec.



Austin long-wheelbase Gipsy for 15-cwt. loads has alternative petrol or diesel engine and a plastics cab



The new 10-12 cwt. Morris, available also bearing the Austin brand, and (right) a view into the 160 cu. ft. capacity body

supplements the existing Series 152 15-cwt. capacity vehicles, and a long-wheelbase Austin four-wheel-drive Gipsy utility vehicle. The additional vehicle in the 702 range is a factory-produced 6-cu. yd. tipper on a 10-ft. wheelbase, which can incorporate either Telehoist or Edbro tipping gear and body, offered at a competitive price.

Familiar Components

The new Austin and Morris 10-12 cwt. capacity vans, which are attractively styled and have just

case of the new lighter vehicle, its performance provides rapid acceleration and good hill climbing, besides a maximum speed of 55 m.p.h. fully laden. A Solex horizontal carburettor, completely surrounded by the air cleaner to give protection from dust and grit, permits the complete engine and gearbox to be mounted compactly between and a little to the rear of the front seats.

The four-speed synchromesh gearbox provides forward ratios of 3.944, 2.403, 1.49 and 1 to 1. It is equipped with an ingenious and sturdy remote-

Independent Front Suspension

Ensuring a high standard of comfort for a crew of two and obviating breakage of fragile goods, the independent front suspension by coil and wishbones is identical and therefore interchangeable with that of the Austin A55 and Morris Oxford saloons, apart from having stiffer coil springs. Rear suspension is of semi-elliptic leaf pattern, giving excellent riding characteristics whether running light or with a full 12-cwt. payload.

The placing of engine and gearbox much farther to the rear of the van than is customary is designed to provide an excellent front-to-rear weight distribution, in order to avoid rear-wheel locking and lifting when braked hard under lightly laden conditions. The employment of i.f.s. permits a really small turning circle of 33 ft.—only six inches more than the highly manoeuvrable 5-cwt. Seven and Mini-Van!

Servicing Simplicity

For routine maintenance and adjustments, the engine is readily accessible by lifting the central panel between the cab seats; greater access for a top-end overhaul is possible by the ready removal of a second panel. For a major overhaul (which in the case of the similarly powered 152 and J2 vans, is commonly as infrequent as 90,000-mile intervals) the engine and/or gearbox can be lowered clear of the floor without difficulty. Both gearbox and differential unit can be quickly removed and dismantled, factors designed to minimise off-the-road delays. A feature of the construction is a single-

skin front panel, enabling minor front-end damage to be inexpensively repaired.

The body, of pleasing appearance, offers excellent payload area within compact overall dimensions; the platform area of 7 ft. 11 in. by 5 ft. is achieved in a little over 13 ft. overall length and body capacity is 160 cu. ft. The body shell is of all-steel welded unitary construction combining great rigidity with light weight. During production, the lower half of the shell undergoes a six-stage phosphate pretreatment followed by slipper dipping and the upper half is sprayed in primer prior to painting. Double rear doors are of useful width having retaining straps and safety hooks to prevent them from opening beyond the van width. Sliding or hinged cab doors are available, either having sensibly planned sliding glass windows and push-button exterior handles. The body flooring is ribbed for strength and hard wear, the shell itself having generous internal bracing for box-like strength.

Driver Considerations

An exceptionally large curved windscreen, with two large wipers and thin pillars, assure good visibility in all conditions; a fresh air heater-demister is available at extra cost. Instruments, which include speedometer, water temperature gauge, fuel gauge and ammeter, besides the usual warning lights and conveniently positioned toggle switches, are mounted on a vertical central panel. It is flanked by two roomy parcel shelves. High-placed headlamps and prominent flashing direction-indicator lamps are a good feature.

Access to and from the cab is unhindered by virtue of wide door openings and low wheelarches and passage across the vehicle from the driving seat is similarly unhampered. The rearward engine compartment is sound and heat insulated.

Long-Wheelbase Gipsy

The new long-wheelbase Austin Gipsy pick-up, which supplements the range of 90-in. wheelbase petrol- and diesel-engined vehicles, has a payload capacity of 15 cwt. and wheelbase of 111 in.; the body capacity is 34 cu. ft. below the waistline. Using the sturdy and familiar 2.2-litre petrol or 2.2-litre diesel engine, the l.w.b. Gipsy is mechanically similar to the present Mark II vehicle, apart from the fitting of large semi-elliptic leaf springs at the rear in place of the Flexitor rubber units to accommodate the increased payload, particularly on rough cross-country going. The robust welded tubular chassis with five crossmembers has been extended and strengthened on the new vehicle and larger 7.00-16 semi-cross-country tyres are fitted as standard, sizes of up to 8.20-15 being available to special order.

The l.w.b. Gipsy has a plastics cab with sliding glass sidescreens giving full weather protection and a high standard of comfort for two or three persons. The rubber-in-torsion Flexitor independent suspension at the front permits large wheel movements on the worst of track or road conditions and requires no maintenance. A maximum speed of 65 m.p.h. is claimed and a fuel consumption of around 20 m.p.g. As on the short-wheelbase versions, the new pick-up is available with a wide range of optional extras.

New Tipper

The popular Austin and Morris 702 s.w.b. chassis is now available with a choice of tipping gears and bodies fitted as original factory equipment. Competitively priced at £1,407 complete, either may be ordered with Edbro or Telehoist equipment. Previously it was necessary to purchase the chassis and body separately. The Edbro version has 2LN end-ram tipping gear and a steel body of 6 cu. yd. calibrated capacity, with detachable body sides. The Telehoist version has SL7 underfloor hydraulic ram and 6-cu. yd. steel body. Both have spare wheel, spare wheel carrier and mudflaps fitted as standard.

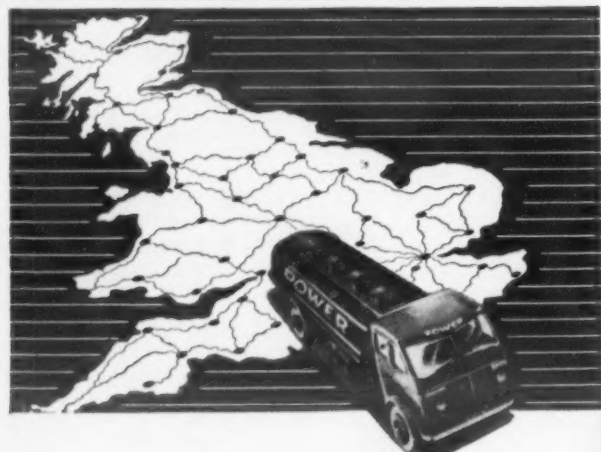
The 702 Austin and Morris Commercial are powered by the B.M.C. 5.1-litre diesel engine, which develops 105 b.h.p. (gross) at 2,600 r.p.m. and 232 lb./ft. torque at 1,500 r.p.m. The tipper uses the 120-in. wheelbase chassis with 6.67 to 1 single-speed axle and 8.25-20 tyres as standard, giving a maximum speed of 42 m.p.h. fully laden. As with other 7-ton chassis, optional extras include power steering, Eaton two-speed 16802 series axle, the new B.M.C. five-speed gearbox and 9.00-20 tyres. Maximum gross weight is 11 tons.

BUS-PAINTING AID

Dexion Scaffolding In U.S.A.

FOLDING scaffolding which saves room, money and labour and allows four men working simultaneously to paint buses has been built by Avenue B and East Broadway Bus Company, New York, using Dexion slotted angle. Conventional fixed access platforms could not be used because of the limited space available. After consulting Dexion, the firm bought 1,000 ft. of Dexion and built a scaffold on the cantilever principle. The supporting brackets were hinged so that they could be swung back allowing the floor of the scaffold to be lowered flat against the walls, thus giving the bus room to get in and out of the paint shop.

The structure is light enough to be raised and lowered by one man and can hold four workers. Dexion was used because of its strength and versatility and because the structure was needed in a hurry. The cost of the Dexion was said to be half that of conventional materials.



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FODENS AT THE SHOW

Examples from Wide Heavy-Duty Range

TURBOCHARGED TWO-STROKE DIESEL

ALTHOUGH outwardly unchanged, the examples of its wide range of heavy-duty vehicles exhibited at Earls Court by Fodens, Limited, have in fact been the subject of numerous detail changes aimed at the elimination of friction and drag, which together have resulted, it is said, in a 15 per cent improvement in operating economy. One of the exhibits however will have an obvious change, this is the three-axle FED6 30 dumper, which is shown with the new turbocharged Foden Mark IV two-stroke diesel engine.

The significant improvements in overall economy

with the minimum of modification to the installation.

The new Mark IV engine is basically identical to the FD6 Mark III blower-scavenged engine, but incorporates various internal modifications to meet changed requirements. The turbocharger, of C.A.V. manufacture, is so mounted as to avoid increasing the overall length of the engine; it delivers air to the scavenge blower through an air-to-air intercooler, of Coventry Radiator manufacture, which is placed in front of the normal engine radiator. The scavenge blower is somewhat re-



Typical Foden heavy-duty eight-wheelers, which now show economy improvements of up to 15 per cent

achieved in Foden vehicles is exemplified by the company's latest test results with its 24-ton-gross eight-wheelers. When the K-type eight-wheeler was introduced two years ago, loaded vehicles were generally returning a performance of about 250 ton-miles per gal. over the company's standard test route. Similar vehicles are now commonly performing at up to 292 ton-miles per gal. over the same route.

Detail Improvements

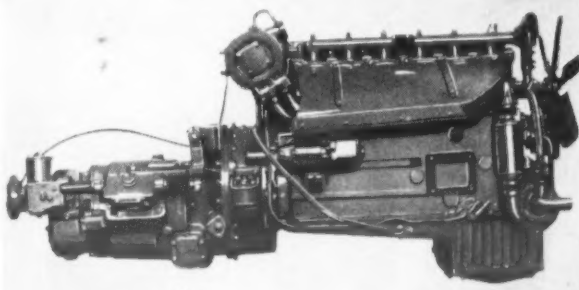
These advances represent the sum of numerous improvements aimed at the reduction of drag, but a large proportion is the result of improving the efficiency of worm-drive axles and of the use of the new Shell Dentax synthetic axle oil. The mechanical changes in the axle are of a minor character only, effecting the wormshaft mountings and bearings. In conjunction with Dentax oil, these have raised the efficiency of the worm-drive axle to the level of the bevel axle in the low-speed high-torque regime, according to Foden engineers; in one of the company's standard tests it was found that the latest type of axle lubricated with Dentax finished the test at a temperature 100 deg. F. lower than was common hitherto and showed an improvement in efficiency of 3 per cent.

The Foden range is illustrated on the company's stand by three Gardner 6LX-powered eight-wheelers fitted respectively with tipping bulk cement, 4,200-gal. tank and open tipping bodies; a Gardner 5LW-powered KG 5 14-ton gross chassis with 18-ft. long van body; an export six-wheeler powered by a Cummins NH220 diesel; and the FED6 dumper for 30 tons gross already mentioned, powered by the turbocharged Foden diesel. The vehicles collectively demonstrate the variety of Foden transmissions available in the standard range and the popularity of the Foden-designed and built moulded resin-glass cab, which

is retained to produce stability of running and rapid acceleration. Devices are incorporated to avoid excessive exhaust smoke during acceleration and to enable a wide variety of turbocharger matching conditions to be met, so as to enable the characteristics to be tailored to the particular application as required.

Performance

The performance characteristics for a typical application dumper duty, are shown in the accompanying performance curves, but very considerable variations in characteristics can be obtained by



Turbocharging brings the output of the Foden six-cylinder two-stroke diesel up to 210 b.h.p. and 550 lb./ft. torque

suitable rematching of the turbocharger where this is desirable, for example when used in conjunction with a torque converter.

The weight of the six-cylinder engine, less electrical equipment but complete with fuel and oil filters and engine mountings, including the intercooler, is 1,420 lb. This compares with 1,236 lb. for the Mark III engine of 150 h.p. to a similar specification. The specific weight of the Mark IV engine is therefore 64 lb. per b.h.p. compared with 84 lb. per b.h.p. for the Mark III and an even more marked improvement is noticed when the specific weight is compared on a maximum torque basis. The maximum torque of the Mark IV is 550 lb./ft., giving a weight of 2.58 lb. per lb./ft., against the Mark III figure of 365 lb./ft. torque, giving a weight of 3.4 lb. per lb./ft. Specific power is 51.2 b.h.p. per litre.

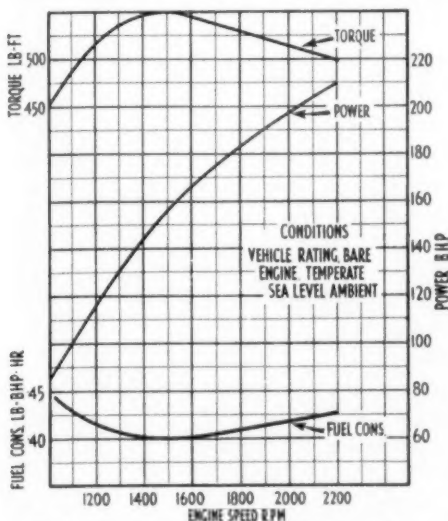
Dimensionally, the only significant increase is that of height which is increased some 8 in., but the disposition of the turbocharger about the engine is relatively flexible and this enables the best use to be made of the available power-unit space. The intercooler, which mounts ahead of the radiator, increases the fore-and-aft dimension by some 3 in. only.

VEHICLE COMPONENTS IN S.A.

New Company Formed

A NEW South African company, Ruberowen, has been formed by the association of the Vanderbijl Engineering Corporation with Rubery, Owen and Co., Limited, to manufacture motor vehicle spares in a new factory at Struandale, Port Elizabeth. It is first to seek markets in the motor vehicle assembly plants in Port Elizabeth and then in other assembly plants in the Union. With the new factory in full production, a very large percentage of the parts going into locally assembled vehicles will be made in South Africa and there will be a gradual decrease in the range and volume of parts and spares imported. The South African engineering corporation and the British firm are jointly financing the new company.

The Vanderbijl Engineering Corporation will supply all the steel requirements of the new components factory, which it is planned to have in operation in March next year. The partners in this scheme have taken over the Roodepoort, Transvaal, plant of Metal Pressings, Limited, which in the past has made steel pressings and drop forgings for South African Railways, but is now being converted to produce motor vehicle parts and is to operate in close association with the Port Elizabeth factory. The British firm is supplying senior technicians for technical co-operation with the S. African company.

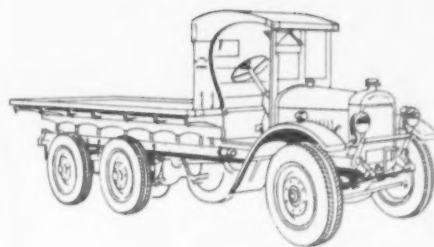


Performance curves of the Foden turbocharged Mark IV two-stroke diesel engine matched for dumper duty

is now specified by about 50 per cent of the company's customers.

Turbocharged Diesel

For the present, only the six-cylinder engine in the Foden range has been developed for turbocharging, as the particular application in which the engine is offered—the heavy-duty dumper—has for some time shown the need for increased power and available space is severely restricted. As the turbocharged engine is basically similar to the standard Mark III unit, but develops 210 b.h.p. compared with 150 and has the remarkable increase of 50 per cent in peak torque output, a significant improvement in vehicle performance has been achieved



The Thornycroft 'A3' rigid six-wheeler illustrated is a typical example of the type of double drive vehicles which were built for both Home and Export from 1926 onwards.

Serving Thornycroft

THROUGH THE YEARS



The new Thornycroft 'Swiftsure' is a high performance 6/7 tonner, more powerful and faster than its worthy predecessors. Thornycroft rely on Hardy Spicer propeller shafts and universal joints as with all their vehicles in the long years of the company's history. Through their research and development, Hardy Spicer have more than met the demands imposed by the challenge of increasing strain on transmission equipment.

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COMMERCIAL VEHICLE TEST

Austin Seven 5-Cwt. Van*

NEARLY 60 M.P.G. FULLY LOADED AT 30 M.P.H.

THE many radical departures from orthodox practice in the design of the new B.M.C. light delivery vehicle, which is available both as the Austin Seven van and as the Morris Mini-van, will already be familiar to most readers from the wide coverage in the technical and lay Press when the cars, from which the vans are derived, were introduced and from the description of the vans published in our issue dated June 18, 1960. Briefly, the design embodies a welded pressed-steel chassis-body structure, with two quickly detachable running-unit groups mounted on bolted-on sub-chassis at the front and rear. The front group comprises the transverse

make a decision which to use at the time of purchase, since two distinct distributor settings, one for each grade of fuel, are specified and separate preset distributor heads are available. In the test vehicle, which was in our charge for a week and was driven under a variety of conditions nearly 400 miles, standard grade petrol costing 4s. 7½d. a gallon in inner zones was used throughout. Among outstanding impressions of the vehicle are its remarkable fleetness and ease of handling in heavy traffic, exceptional stability both fully and lightly loaded and its outstanding fuel economy.

Our load comprised 10 56-lb. iron weights and since some of our running was with a full load and

some with a part load, we gained a fair amount of experience in loading and unloading. While the low platform height was undoubtedly an advantage, depositing the weights forward of the wheelboxes or recovering them therefrom proved to be a hands-and-knees job inside the body because of the low roof height, whether the side or rear doors were used. This would probably not be a problem with the majority of packages carried, which could be expected generally to weigh less than ½ cwt. The friction stays held the rear doors firmly open at 90 deg. and had the advantage that they did not need unlatching to close. Fully loaded weight distribution seemed equitable; with the rather dense load carried fairly well forward to prevent sliding during brake applications (which it did not in one simulated emergency stop), a weighbridge check showed that 8½ cwt. of the total weight (without crew) of 17½ cwt. was carried by the front axle.

Sparkling Performance

The crew quarters proved surprisingly adequate for all the sizes and shapes of human that sampled it while the vehicle was in our charge, with useful space for small parcels and items of equipment in a shelf each side of the central instrument cluster and capacious pockets in the doors. Only the sliding windows and inside door-handling arrange-



A 4-in longer wheelbase and about 1-ft. greater overall length give the Austin Seven van more pleasing proportions than the car from which it is derived

engine combined with radiator, gearbox and final-drive unit, front wheels, steering and independent rubber suspension units. The rear group comprises only the wheels and independent rubber suspension units.

The engine is basically the well-developed B.M.C. 850-c.c. four-cylinder water-cooled o.h.v. petrol unit, which with a compression ratio of 8.3 to 1 develops 34 net b.h.p. at 5,500 r.p.m. and 44 lb./ft. torque at 2,900 r.p.m. The unit is modified to take a four-speed synchromesh gearbox inside the engine casings beneath the crankshaft, coupled through a normal 7½-in. hydraulically

TEST RESULTS AT A GLANCE

Vehicle Details	Test Results
MAKER: Austin Motor Co., Limited, Longbridge, Birmingham	ROUTE: Mixed town and country driving including standard test route.
TYPE: Austin Seven 5-cwt. van.	RUNNING WEIGHT: For measured performance 17½ cwt. (876.3 kg.) plus driver.
ENGINE: B.M.C. four-cylinder overhead-valve water-cooled petrol unit set across frame at front; bore 2.478 in. (62.9 mm.), stroke 2.687 in. (68.26 mm.), capacity 51.74 cu. in. (848 cc.), compression ratio 8.3 to 1, 34 b.h.p. (net max.) at 5,500 r.p.m., 44 lb./ft. (max.) torque at 2,900 r.p.m.	PAYLOAD: 5½ cwt. (286.7 kg.).
TRANSMISSION: Clutch, hydraulically operated single dryplate 7½ in. (190 mm.) dia.; gearbox, four-speed synchromesh (ex. first) incorporated in engine sump, ratios 3.628, 2.172, 1.412 and 1 to 1 forward, 3.628 to 1 reverse; final drive, helical spur gears and differential, ratio 3.765 to 1, in unit with sump gearbox driving front wheels directly by halfshafts incorporating rubber universal joints.	FUEL CONSUMPTION: (1) continuous running over 15-mile standard route 59 m.p.g. (20.9 km. per litre) at 30 m.p.h. (48 km.p.h.) average speed; (2) making four stops per mile over 10 miles 44.4 m.p.g. (15.7 km. per litre).
BRAKES: Lockheed hydraulic leading-trailing all round, 7 in. (177.8 mm.) by 1½ in. (31.75 mm.); Hand, cable to rear wheels.	GROSS TON M.P.G.: 50.74 (18.23 tonnes/kg./litre).
TYRES: 5.20-10.	PAYLOAD TON M.P.G.: 15.34 (5.54 tonnes/kg./litre).
WHEELBASE: 7 ft. 0½ in. (2.138 m.).	MAXIMUM GRADIENT CLIMBED: 1 in 4½ (23.5 per cent).
WEIGHT: In running trim 12 cwt. (608 kg.) approx.	TURNING CIRCLE: 34 ft. (10.36 m.) wheeltrack.
PRICE: £280	ACCELERATION: Averages of four runs through gears.
	0-30 m.p.h. 8.9 sec.
	0-40 m.p.h. 13 sec.
	In top gear:
	10-30 m.p.h. 13.2 sec.
	BRAKING: Average of four measured stops from 30 m.p.h. 37 ft., equivalent to 26 ft. per sec. per sec. or 0.81 g. overall deceleration; Don meter readings averaged 82 per cent.
	ESTIMATED TOP SPEED: Over 70 m.p.h. (112 km.p.h.).
	OVERALL FUEL CONSUMPTION: For 370 miles town and fast country driving, including standard test, with loads varying from 2 to 5 cwt., 46.3 m.p.g. (11.640 km. per 100 litres).

operated plate clutch. The gear-driven final drive and differential assembly is mounted on the side of the crankcase, each differential sunwheel shaft being connected directly to the front-wheel hubs by short shafts incorporating rubber universal couplings. Front suspension is by unequal-length levers and rubber cone springs damped by telescopic hydraulic shock absorbers, with ball-jointed swivel axles. Rear suspension uses similar rubber

ment gave cause for adverse comment. The windows provided wide adjustment for regulating ventilation but were just not designed for making hand signals comfortably. The cable release for the door catches worked satisfactorily for the cognoscenti, but the uninitiated all wanted to pull it for closing the door, which just did not work, but sought fruitlessly for a door handle when ready to leave. In the absence of any other



Good accessibility of engine and auxiliaries with the bonnet propped open and, right, neat and convenient battery and spare-wheel storage under the van floor proper behind the seats



springs and dampers with independent trailing arms. Rack-and-pinion steering gear, 7-in. dia. hydraulic brakes, pressed-steel disc wheels with 5.20-10 tubeless tyres and 12-volt electrical system make up the general specification.

Roomy Van

The van has a wheelbase of slightly over 7 ft.—4 in. longer than the saloon—and an overall length fractionally under 10 ft. 10 in.—about 10 in. longer than the car. Overall width is 4 ft. 7½ in. and height 4 ft. 6½ in. Load space available behind the seats is 4 ft. 7 in. long by 4 ft. 5½ in. wide by 3 ft. 1½ in. high, giving a capacity of 46½ cu. ft. Interior length available using the space occupied by the optional passenger's seat is 8 ft. 6½ in. and this space also provides an additional 12 cu. ft. of load space. Floor height is 1 ft. 5½ in. and the rear door aperture is 3 ft. 4 in. wide by 2 ft. 7½ in. high. Empty running weight is about 12 cwt. and the recommended maximum load is 5 cwt. and crew of two.

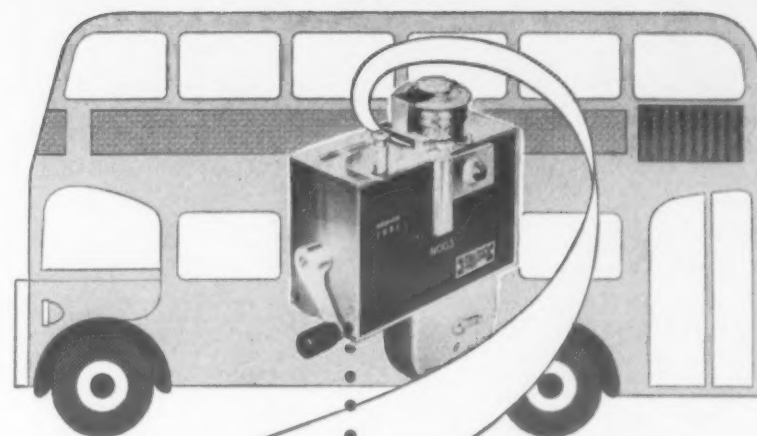
With the high compression ratio, the engine could be expected to gain some advantages from use of premium-grade petrols, but can operate equally well on standard grades. It is advisable to

apparent solution, we elected to close the doors by pulling on the door pocket frames.

The little van had a performance well above that required for delivery work, giving sparkling performance down in the range of speeds normally obtaining in that type of service. Fully loaded, in our usual four-run tests, it took an average of just under 7 sec. to reach 30 m.p.h., which was reached easily in second gear, and 13 sec. to go from rest to 40 m.p.h. The high power-to-weight ratio also resulted in good flexibility; notwithstanding the high top-gear ratio of 3.765 to 1, the vehicle could be throttled back to 10 m.p.h. in that gear and would pull away smoothly from that speed, to reach 30 m.p.h. in an average of just over 13 sec. Even with a full load, the steepest gradients likely to be met in service will be found well within the capabilities of the vehicle. We had a non-stop run up Succombs Hill, using second gear on the 1 in 5 and 1 in 4½ sections and third gear over the easier middle reach, and subsequently made comfortable stops and starts on the 1 in 4½ gradient, both in first and reverse gears.

We covered about 150 miles in the van on open main roads with only a 2-cwt. load, when it was mostly driven hard and fast. The front driving wheels would spin rather easily in starting quickly

(Continued on page 20)



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DIRECT-INJECTION PERKINS ENGINE

Develops 112 b.h.p. at 2,800 r.p.m.

FOR 7- TO 8-TON CAPACITY VEHICLES

INTRODUCED this week by Perkins Engines Limited, is a new direct-injection diesel engine for goods and passenger vehicles in the 7- to 8-ton capacity class. It is on view for the first time at the Commercial Motor Show on the Perkins stand. Named the Six 354—denoting that the engine has six cylinders and is of 354 cu. in. capacity—the new power unit develops 112 b.h.p. at the high maximum governed speed of 2,800 r.p.m. It is the first direct-injection vehicle engine to be made by Perkins, although an extremely successful four-cylinder direct-injection engine for farm,

of 354 cu. in. (5.8 litres). The compression ratio is 16 to 1. Dry weight of bare vehicle engine (complete with exhaust and dynamo, but not including flywheel, flywheel housing, starter motor, fan or air cleaner) is 854 lb. and the typical weight with all accessories is 1,020 lb. The length is 37 7/8 in. (front of fan to crankshaft flange), the width is 23 in. overall and the height is 33 1/4 in. (not including air cleaner).

The cylinder block is cast integrally with the crankcase in high-duty cast iron, the sides of the cylinder block extending below the crankshaft

each inlet valve stem to prevent oil from being drawn down the valve guide.

The combustion chamber is in the piston crown in the form of a toroidal cavity slightly offset from the centre for alignment with the atomiser nozzles. The atomisers are housed in cast sleeves on the left-hand side of the cylinder head and are cooled by jets of water directed on to the nozzle bosses and valves through cored deflectors cast in the cylinder head. These deflectors are in direct communication with the cast water rail on the side of the cylinder block.

Camshaft and Crankshaft

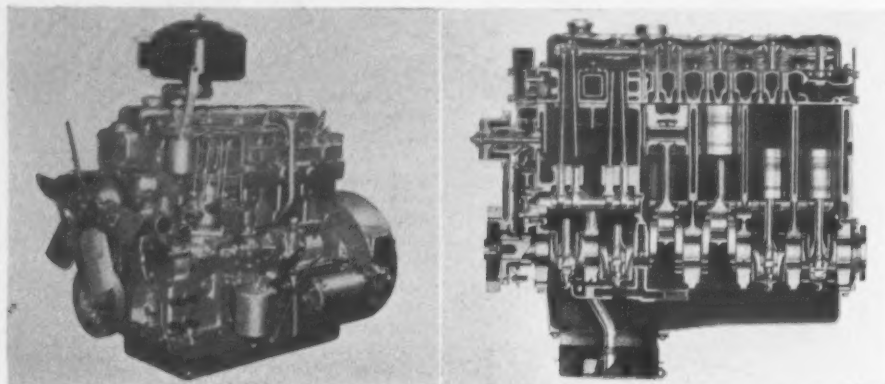
The camshaft is of high-duty cast iron, with chill-hardened cams, and is mounted in a low position on the right-hand side of the cylinder block. It is supported in four bearings machined directly into the cylinder block, the bearings being lubricated by pressure feed. The cams and tappets are splash lubricated. The valves are operated by cast-

shaft through serrations and is retained in position by a turning dog, suitably machined for a turning handle. Crankshaft end float and thrust is taken up by two 360-deg. steel-backed copper lead thrust washers located in the centre bearing cap and cylinder block. A crankshaft vibration damper is fitted on the front face of the crankshaft pulley, when required.

Main Bearings and Timing Gears

Seven main bearings are provided, of the thin-wall prefinished steel-backed copper lead-lined type. Each half bearing is located by a tab which fits into a slot machined into the crankcase or bearing cap. The bearing caps are of high-duty cast iron and are secured to the crankshaft by two high-tensile steel setscrews locked by tab washers, the caps being located by ring dowels.

The camshaft and fuel pump layshaft are driven from the front end of the crankshaft by a case-hardened steel crankshaft gear, through twin idler gears in hardened steel to high-duty cast-iron auxiliary shaft and camshaft gears. Helical teeth are used throughout. The timing gears are enclosed by a cast aluminium alloy case and cover bolted to the front face of the cylinder block. Pressed-steel inspection covers at the front provide access to the camshaft and auxiliary drive gears. The camshaft



The Six 354 showing arrangement of auxiliaries, including the C.A.V. DPA fuel-injection pump; right, a sectioned view

marine and industrial applications has been in production at Peterborough for some time.

The Six 354 combustion chambers are toroidal bowls, slightly offset from centre and formed in the top of the pistons. Fuel is injected directly into the cylinders through multi-hole atomisers. It is a comparatively small and compact unit for its power output—it weighs only 854 lb.—and it develops maximum torque of 260 lb./ft. at 1,450 r.p.m. Vehicles fitted with the new engine are said to have exceptionally good climbing and acceleration features under full load.

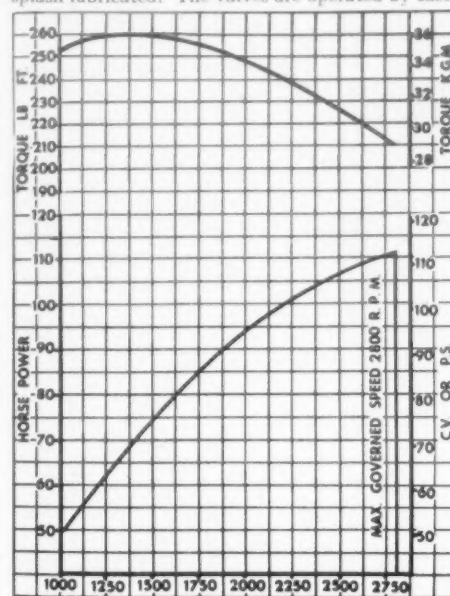
The new engine has been rigorously tested under different types of operating conditions by the manufacturer and has been working in vehicle fleets of independent operators for the last 12 months. These fleet owners are enthusiastic about the Six 354, particularly about its low fuel consumption, quick starting, high performance and easy maintenance.

Leading Particulars

The engine has a bore of 3 1/4 in. (98.4 mm.) and a stroke of 5 in. (127 mm.), giving a cubic capacity

centre line to form a stiffening skirt. Dry-type renewable pressed-in unshouldered liners of high-duty cast iron are fitted. The water jackets are carried down to the full length of the cylinders and a water space is provided between all cylinders. The cylinder head is of high-duty cast iron and is secured to the cylinder block by high-tensile steel studs and nuts. The overhead valve rocker gear is mounted on the cylinder head and is enclosed by a pressed-steel cover. One inlet and one exhaust valve per cylinder are provided, the valves operating in unshouldered close-grained cast-iron guides fitted into the cylinder head.

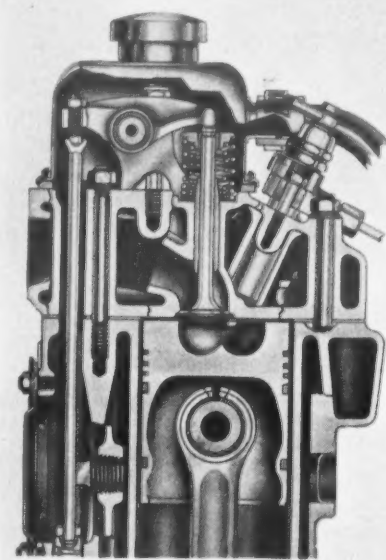
The inlet valves are of B.S.En.18S, 1 per cent chromium steel and the exhaust valves are of 21 4N steel. The ends of the inlet valve stems are flame hardened to resist wear and the exhaust valve stems are Stellite tipped. Two springs, retained by a hardened cap and split conical cotters are provided for each valve, the inner springs seating on hardened steel pressings located on the top of the cylinder head. An oil seal in the form of an oil-resisting rubber collar is provided at the top of



Typical performance of the new Perkins direct-injection Six 354 diesel engine

iron mushroom-type tappets, with chill-hardened tappet faces, located in guides machined in the cylinder block, through pushrods with hardened ends to cast-iron rocker levers. The radiused ends of the rocker levers bearing on the valve stems are hardened. Tappet adjustment is effected by a hardened ball-ended adjusting screw and locknut at the pushrod end of the rocker lever. The rockers and valve gear are lubricated by an intermittent feed taken from the second camshaft bearing through a drilled hole to the hardened hollow rocker shaft.

The crankshaft is forged from chrome molybdenum steel to B.S.En.19T. Crankpin and main journals are induction hardened to reduce wear and the rear of the shaft is machined to provide an oil thrower. Oil seals are provided at the front and rear of the crankshaft. A cast-iron crankshaft pulley is driven from the front end of the crank-



A section through a cylinder showing the combustion system

is located axially by a collar registering in a groove at the front end of the camshaft. The timing gears are lubricated by an intermittent feed from the idler gear hubs.

Pistons and Gudgeon Pins

The pistons are of high-silicon aluminium alloy and have a toroidal combustion chamber cavity in the crown. Each piston is fitted with five rings, three compression rings and one scraper ring being

(Continued on page 46)

The DODGE

'61 line-up is bigger and better than ever!

INTRODUCING THREE NEW FORWARD CONTROL MODELS
—AND A NEW 354 CU. IN. DIRECT INJECTION DIESEL

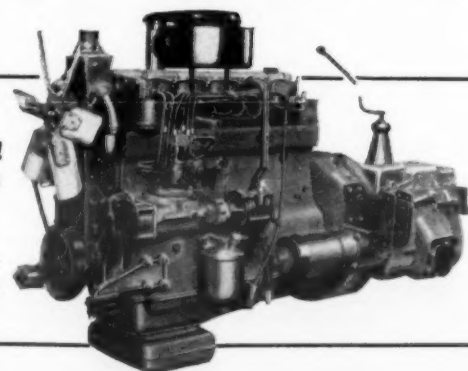


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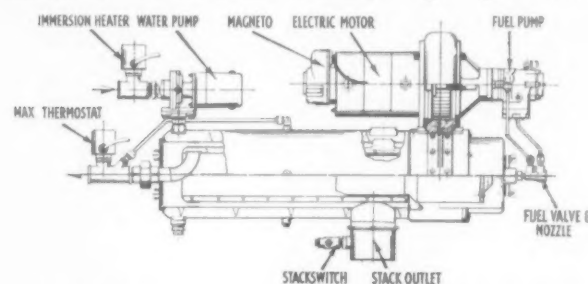
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AUTOMATIC VEHICLE HEATER

Oil-Fired Vapor Unit

AUTOMATIC heating of transport vehicles in a satisfactory manner is not always easy to achieve; a new essay of great promise in this direction has been introduced by the Vapor International Corporation of Chicago and is made in Europe by the Netherlands subsidiary, Vapor

in the return water line. Should the water, returning to the heater, be above the predetermined setting of the immersion thermostat, the circulating water pump of the heater will merely move the water through the heater and through the entire system. An even temperature will thus be maintained throughout the entire circuit. As soon as the temperature of the circulating water has fallen below the predetermined setting, the heater is fired again.



Schematic diagram of the B70 heater showing its method of operation

International Corporation N.V., Breukelen, Holland. This new B70 unit, specially designed for diesel-engined buses, railcars, locomotives, fishing boats and motor boats of all kinds, will range alongside the company's well-known products in railway heating, combustion and temperature controlling systems. The B70 is rugged, simple, with a minimum of moving parts and burns commercial diesel fuel.

What it Does

On any diesel-powered vehicle the B70 will automatically accomplish three essential functions:

- (1) Will supply, when needed, additional heat for the passenger compartment of railcars and buses, thus adding to the comfort of the passengers.
- (2) Will keep the engine block at the required temperature for optimum operation at all times. When the amount of heat released by the coolant water is not sufficient (operation on long declivity), the B70 will cycle on and will immediately generate the additional heat necessary to bring the temperature of the coolant circuit to the proper level.
- (3) The heater will also provide layover protection when the vehicle is not in operation. This prevents either idling of the engine or costly cold starts.

The manufacturer states that the operation of the heater, once started, will remain fully auto-

hot gases generated by the combustion follow a double pass circuit around the water jackets before being released through the exhaust stack. The general arrangement of the transfer surfaces (double pass gases and double pass water circulation) secure a highly efficient heat exchange



The new Vapor B70 heater for diesel-engined vehicles and vessels

between the hot gases and the cold water. A schematic diagram of the B70 heater is shown.

Fine Performance

A fine performance of this heater on test was well demonstrated some time ago when a B70, installed on a diesel railcar of the French National Railways, kept the water in the coolant system of the diesel engine at a temperature varying between 49 deg. and 65 deg. C., throughout the night while the car was standing outside in an ambient temperature of minus 15 deg. C. The B70 water heater can be used also wherever there is a need for hot water if the thermal output requirement falls within its capacity.

This heater is manufactured in Holland by the Vapor Machinefabriek N.V., Breukelen, a wholly owned subsidiary of Vapor International Corporation, Limited, of Chicago, and additional information as well as quotations may be obtained from Vapor International Corporation, N.V., Breukelen, Holland or from Vapor International Corporation, Limited, 224 South Michigan Avenue, Chicago, 4, Illinois, U.S.A.

B70 DIMENSIONS AND DATA

Power	12, 24 or 72 volts d.c.
	—as specified
Overall length	1,070 mm.
Overall height	275 mm.
Overall width	530 mm.
Empty weight	54 kg.
Power requirement:	
Heater motor	200 watts at full load
Water circulating pump	50 watts at full load
Total power requirement	250 watts
Atomisation	Air
Ignition	Constant electric spark
Motor speed—Heater	1,750 r.p.m.
Pump	3,000 r.p.m.
Capacity maximum	18,000 kg./cal. per hr.
Fuel consumption, max.	2.5 litres per hr.
Factory adjusted thermostat setting	66-75 deg.
Stack temperature, max.	325 deg.
Water circulation	35 litre per min.

matic. The heater will cycle on and off in response to the signal of an immersion thermostat installed

PREFABRICATED WHITE LINES

Low-Cost Wimpey-Causeway Units

A NEW method of road marking has been developed and patented by Wimpey Asphalt and Causeway Reinforcement, Limited (a member of the Amber group of companies). The method makes use of white line units which are a combination of Causeway triangular steel reinforcement, mastic asphalt and a white topping of verynyl strip secured to the armour frame with an efficient bonding material. The verynyl surface is said to be exceptionally white, self-cleaning, anti-skid, and immune from attack by oil, grease or petrol. The units fit flush with the road surface when installed. Each unit is 3 ft. long, 1 in. deep and of the standard 4-in. width. Other sizes of line unit as well as letters can be supplied to order.

The verynyl surface of the units, it is claimed, should last at least five years and is then easily replaceable. The ex-works cost of 12s. a unit and the ease with which they can be laid is said to provide an initial cost only 40 per cent of that of white mastic. Long maintenance-free service and negligible renewal cost also contribute to overall economy in road-marking costs.

SYNTHETIC HOSES

Compoflex Equipment Cuts Costs

USED for gravity feed loading of road tankers by London and Thames Haven Oil Wharves, Limited, Compoflex hoses have helped to cut maintenance costs; 360 hoses, 2 in. int. dia. by 10 ft., were installed in the Manorway loading raft at the company's Thames Haven site over four years ago. Ever since, they have dispensed some half-million gallons of oil and petroleum every day and are said to have given continuously trouble-free service. Previously, when heavy metal hoses were used, leakage sometimes proved a serious and costly problem.

Light And Flexible

The new hoses, which are based on Hycar synthetic rubber, have also proved popular with loaders. The light weight and flexibility of Compoflex make it much easier for one man to carry out loading operations, thus saving time and effort.

Compoflex hoses are manufactured by Compoflex Co., Limited, and Hycar synthetic rubber is made by British Geon, Limited, a company in the Distillers Plastics Group.



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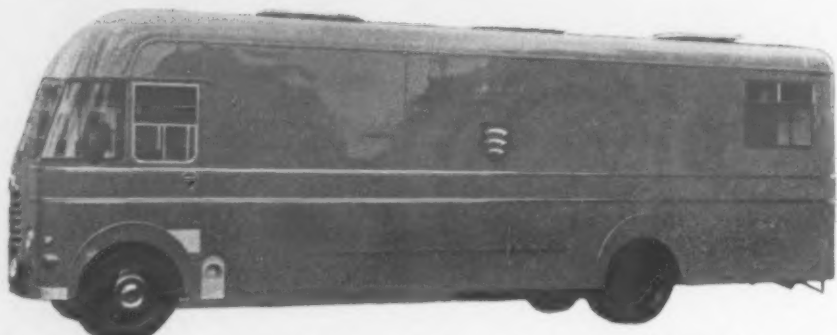
New fronts seen arriving at Earls Court. Miles (Hawker Siddeley) cab and 4,000-gal. tank on Thornycroft Trusty eight-wheeler and, right, new plastics cab on Scammell Handyman tractor

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AUSTIN SEVEN VAN ON TEST

(Continued from page 17)

on wet roads and closing the throttle in fast corners brought a pronounced oversteer. But generally our verdict is that it is an exceptionally stable and safe vehicle, if not entirely foolproof. But what vehicle is? Even the fool is probably less likely to hurt himself or others in this vehicle, which with its very low centre of gravity would be very difficult to overturn, if not to spin. The independent rubber suspension we found gave us a comfortable and quiet ride over normal road undulations and much less of a shaking over some rough surfaces, and it seemed insensitive to the state of the load or even some gross asymmetrical loading we inflicted on it during the test. Over short-pitch surface inequalities, such as a line of closely spaced road studs, it was very noisy.

Brake Compensation

A feature of the hydraulic braking system used is a newly developed Lockheed valve designed to limit the force applied to the rear brake shoes when a pedal pressure of more than 40 lb. is used. This is an excellent safety device of the greatest practical value, particularly on a vehicle that runs rather tail light when unloaded, and we found that although it was possible to lock the rear wheels, this did not occur until the front wheels also were on the point of locking, indicating a large measure of achievement of the design aim. In a series of simulated emergency stops measured with our chalk-firing



Low loading plus (or minus) through doors that are held firmly open by friction stays

magazine, the average distance to stop from 30 m.p.h. (van fully loaded) on dry tarmac was 37 ft. The shortest distance recorded was 33 ft. and the longest 44 ft., the last when the ballast weights moved and came charging forward into the driving compartment.

The most outstanding attribute of the new Seven is undoubtedly its fuel economy. It will carry a 5-cwt. load and two adults as quickly on unrestricted roads as any other vehicle with similar payload rating and, because of its small size and superior acceleration, probably more quickly in congested going. Yet it will do this for a fraction of the fuel consumption. In our usual 15-mile continuous running test on A25 between Limpsfield Common and Riverhead, the vehicle returned the figures of 59 m.p.g. at an average speed of 30 m.p.h. In a 10-mile run on A21 making four stops a mile, which included the climb of Polhill, fuel consumption was 44.4 m.p.g. For the whole 370 miles covered, which comprised some 100 miles on the standard test route and 120 miles between home and central London office, all fully loaded, and 150 miles of open road running carrying a 2-cwt. load and driving generally as fast as traffic allowed, the fuel consumption worked out at 46.3 m.p.g.

Low Maintenance Costs

The B.M.C. Minis are also likely to incur unusually low general operating and maintenance costs. The combined engine, gearbox and final drive have a common oil sump and the circulatory system is protected by efficient filters. Topping up the sump also takes care of gearbox and differential-drive lubrication. The rubber suspension requires no maintenance, having an expected life equal to that of the van, and is said to be easier on the dampers than conventional springing. There are only 12 lubrication points, all accessible without a pit or hoist and when the time comes for major attention, removal of four bolts permits the whole front sub-chassis to be wheeled clear. Doubts expressed in some quarters of the life of the very small tyres are unfounded, we are assured; provided wheels are changed round as recommended it is likely to be at least as long as on conventional 5-cwt. vans. All in all, the new vehicle appears as a piece of bold and refreshingly ingenious design that has procured a number of very worthwhile advantages for the operator. At a total price of £360, the production lines turning it out are likely to be busy for a very long time.

WHEEL PAIRS STANDARD

Preferred Leading Dimensions

A NEW British Standard, BS3117:1960—Wheel pairs for locomotives and rolling stock (dimensions) Part 2: Wheel centres and monobloc wheels, has been published by the British Standards Institution. Comprising 15 pages, it is one in a series dealing with complete wheel pairs for locomotives and rolling stock. (Parts 1-4 dealt separately with axles, tyres, Gibson ring tyre fastening and machining and assembly.)

To enable the least number of sizes of wheel centres and monobloc wheels to be manufactured, the standard lays down a limited number of preferred leading dimensions. The four types of wheel centre with separate shrunk-on tyres dealt with are: rolled-steel disc, cast-steel spoked, cast-steel web (normally for small diameters only) and cast-steel to special design. An appendix to the standard gives a list of metric equivalents and the text of the specification proper is amplified by three full-page annotated diagrams.

Copies of the standard can be obtained from the Institution's sales branch, 2 Park Street, London, W.1, price 4s. 6d. (postage extra to non-subscribers).

TAMAR ROAD SUSPENSION BRIDGE, PLYMOUTH

**A NEW LANDMARK IN THE IMPRESSIVE
HISTORY OF CLEVELAND TAKES SHAPE**

Seen in the foreground is the first of the 250 ft. high main towers which will begin and end the 1100 ft. central span. On either side there will be another span 374 ft. long.

Consulting Engineers, Messrs. Mott, Hay & Anderson.

CLEVELAND

THE CLEVELAND BRIDGE & ENGINEERING CO. LTD. DARLINGTON, ENGLAND

What's new in Austin Commercial

since the last C.V. Show?



New 30 cwt., 2, 3 and 4 ton range proved to cut fatigue by nearly two-thirds

This new range has been designed for a wide variety of users. Advanced safety and fatigue-reducing features make it doubly welcome. A leading Industrial Research Unit tested the new cab against a conventional forward control cab and proved it cut driver fatigue by **just on two-thirds**. Important safety features include panoramic visibility (with special parking portholes) and cab doors that don't open beyond the width of the vehicle. The ingenious cab has an easy two-step entry and exit. Low decks make for easier loading. Availability—petrol or diesel, platform or dropside, chassis or chassis/cab. Prices are astonishingly low:

30 cwt. from £530 3 ton from £636
2 ton from £586 4 ton from £696



NEW 5 TONNER with luxury cab and full-view wraparound screen

Austin 5 tonners offer: normal or forward control; 5.1 litre B.M.C. diesel engine or 4 litre O.H.V. petrol; platform, dropside or chassis/scuttle cab. Prime movers (15 ton gross train weight) and normal control tippers.

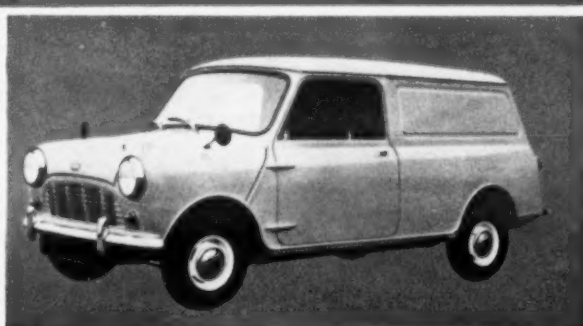
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160 cu. ft. capacity—enough for 57 orange boxes! Easy small-wheel loading. 1,489 c.c. engine.

Superb handling—33 ft. turning circle. Independent front suspension. Wraparound safety vision screen. Synchromesh gearbox with floor lever. Sliding or hinged cab doors. Total cab comfort.

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AND THE NEW 5 CWT. VAN

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AND THE NEW L.W.B. GIPSY

The sturdy Gipsy is now available with either 90 in. or 111 in. wheelbase. Both versions offer: 2.2 litre petrol or diesel engine; independent front suspension; rear wheel drive, front wheel drive or four wheel drive. In blue, green, fawn or grey. With canvas wraparound tilt, hardtop (£50 extra) or as pick-up on S.W.B. Pick-up only on L.W.B. S.W.B. £650 (petrol); £755 (diesel). L.W.B. £720 (petrol); £830 (diesel).

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EARLS COURT—STAND 71

Every van and truck in the all-purpose ½ to 7 ton Austin commercial range is warranted for 12 months and backed by B.M.C. Service—Britain's best service and parts organisation.

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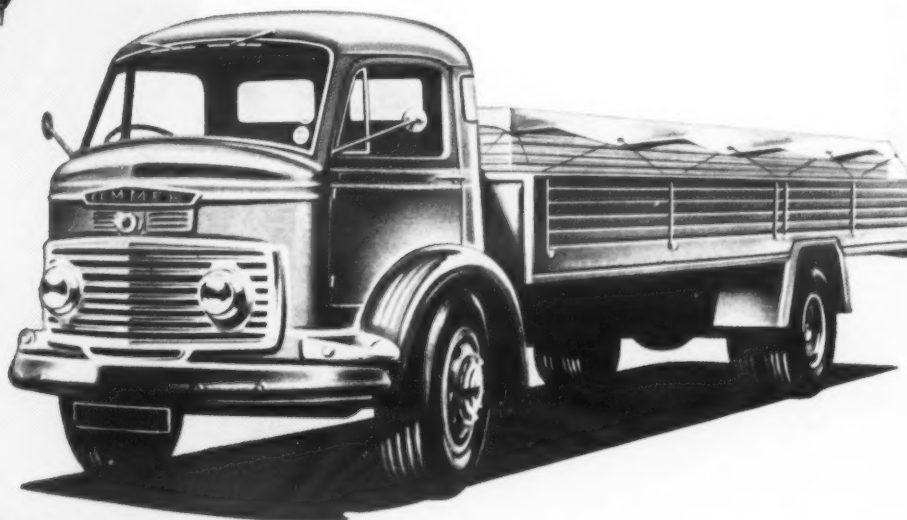
THE AUSTIN MOTOR COMPANY LIMITED · LONGBRIDGE · BIRMINGHAM

ROOTES FOR THAT TOUCH OF GENIUS AT THE SHOW



KARRIER 'BANTAM' 2-3 TONNER

If you're looking for a robust low loader, don't look any further. If you have a specialised transport problem—long haul or short—this solves it. Versatile and extremely manoeuvrable, the popular Karrier 'Bantam' is adaptable either as van, lorry or tipper, and there is a choice of petrol or light diesel engine as well as alternative wheelbases.



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If you're looking for toughness, here it is. If you're looking for reliability, you've found it. These sturdy petrol or diesel-engined trucks with comfortable three-seat cabs have the accumulated experience of over fifty years of commercial vehicle manufacturing built into them. For a truck investment there's nothing to touch them.



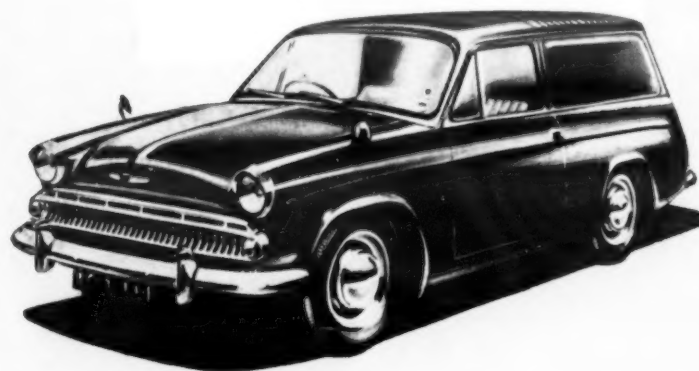
COMMER 3/4 TON PICK-UP

If you're looking for mobility and performance, this popular derivative from the new Commer lightweight range gives it. Full three-seat forward-control cab and a large loading area. There's elegance, manoeuvrability and economy; and a choice of petrol or diesel power unit. This is the answer to all manner of light transport problems.



COMMER 1 1/2 TON VAN

If you're looking for capacity this has it—over 300 cubic feet. If you're after a real running economy, here it is. An all-steel body, with flush fitting sliding doors, choice of petrol or light diesel engine, smooth-ride suspension . . . these are but a few of the many fine features of this outstanding value-for-money van.



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If you're looking for a light, handy delivery van with generous body space, it's here. If you're looking for long service, you're on to it. This tough, good looking, economical, lively 7 cwt. van gives you the best of all possible worlds. You cannot do better than put a 'Cob' on the job!

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PETROL or DIESEL for loads up to 12 tons

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PASSENGER VEHICLE BODYWORK

More Use of Plastics

FROM AMBULANCES TO 78-SEATERS

AS is customarily the case the passenger vehicle manufacturers' stands at Earls Court show a number of examples of bodybuilders' work, but this review is concerned primarily with those which actually figure on the stands of the bodybuilders themselves. They range from ambulances through the small p.s.v.s to high-capacity double-deckers and embrace both new designs and the latest versions of well-tryed and still popular bodies.

The exhibit of Walter Alexander and Co. (Coach-builders), Limited (Stand 48), is one of the forward entrance 72-seat bodies on Leyland Titan PD3/2 chassis which are on order for Glasgow Corporation. Of all-metal construction with light

equipped with the new Duple luxury seating. The second vehicle is based on a forward-control conversion of the standard Bedford J2 chassis and measures 17 ft. 11 in. by 7 ft. 6 in. overall. It is intended to meet requirements for small party tours, feeder services and similar work and the version exhibited has luxury seating for 15 passengers. A more austere layout for bus work seats 19 passengers and an export model for 23 passengers, which is in the demonstration park, is also available in c.k.d. condition. The Willowbrook two-door bus for one-man operation is one of those for Grimsby Cleethorpes Transport on an A.E.C. Reliance chassis and, as recorded in our last issue, three of generally similar design have been placed



The Marshall p.s.v. conversion of the Commer 1-ton van; the 30-seat dual-purpose Harrington body on an Albion Nimbus chassis



steel and alloy members they are assembled in jigs to retain interchangeability in floor frames, bulkheads, top and bottom deck sides, rear frame, and lower and upper saloon roofs. The upper deck seats 41 and the lower 31 passengers and both are heated by duct from a Clayton L6A heater. The lighting is fluorescent on both decks.

The coachbuilding division of Appleyard of Leeds, Limited (Stand 133), shows a new ambulance for service in Bristol which accommodates a stretcher trolley and seven sitting patients or two stretcher and two sitting patients. The Morris

in experimental service by London Transport. The bodywork is, of course, based on the builders' standard bus shell of lightweight metal construction with moulded resin glass front and rear ends, dome and canopy.

Redesigned Coach

Also on Stand 38 is the forward-entrance single-step Dennis Loline for Walsall Corporation with 44 seats on the upper deck and 30 on the lower. Fluorescent lighting is provided throughout, there are recirculatory heaters on both decks and on the upper deck there are two translucent plastics roof lights. It should hardly need emphasis at this stage that the lower deck has a level floor throughout and that the overall height of the vehicle is 13 ft. 6 in. The Viscount Mark 1 body has been completely re-designed and that exhibited, which is for Birch Brothers, is provided, in addition to the customary fittings, with a partition behind and beside the driver with pay-as-you-enter fare equipment. Provision is also made for manual operation of the door by the driver when the vehicle is on express work. The chassis is an A.E.C. Reliance, as is that of another Viscount 1 bodied coach in the demonstration park. Also outside is an example of this builder's express service coach on a Leyland Leopard chassis.

One of the three vehicles shown by Thomas Harrington, Limited (Stand 39), is an entirely new design which is designated the Crusader Mark II. Mounted on a Thames chassis this 41-seater is basically of all-metal construction and has an unladen body weight of 2 tons 10 cwt. Fibreglass plastics panels are fitted to the front, front canopy, rear dome, rear lower panels and wheel arches. The Cavalier is already well known as an all-metal luxury coach body and the arrangement of the one exhibited on an A.E.C. Reliance chassis provides for 37 passengers in individual seats. The third vehicle also represents a field in which this company has made a name for itself. It is a dual-purpose 30-seat body on an Albion Nimbus chassis and is arranged for pay-as-you-



The all-plastics bodied ambulance with air suspension shown by Wadham Brothers

Commercial FG 30 cwt. chassis employed has Dunlop Pneuride air suspension.

Since the last show the already extensive activities of the Duple group of companies have widened still further in scope. Three of the group have stands numbered closely together. These are Duple Motor Bodies, Limited (Stand 35), Duple Motor Bodies (Midland), Limited (Stand 36), and Willowbrook, Limited (Stand 38). The three bodies on Stand 35 are the latest versions of well-proven types. The Super-Vega 37-seat coach on Bedford SB3 petrol-engined chassis has, for example, a new wide-vision windscreen, car type



The Harrington Cavalier coach body on an A.E.C. Reliance; the Yeoman body built by Duple on the Thames p.s.v. chassis. Below, destined for abroad: the M.C.W.-bodied Leyland Worldmaster for Madrid and the 63-seat Guy Victory with Marshall-Mulliner bodywork for Lagos

heating, ventilating and demisting equipment, two twin-unit opening roof panels and more luxurious seating. The substantial capacity of the rear luggage locker is augmented by extra lockers on the nearside and offside, the roof racks being carried off the headrails internally. The Yeoman body mounted on the Thames chassis has made a very successful entry to the market and the latest version has been restyled with a new windscreen, new heating, ventilating and demisting equipment and twin opening roof panels. Similar adjuncts are embodied in the third vehicle on the stand which is the central-entrance version of the Britannia on an A.E.C. Reliance chassis.

The Duple Midland exhibits include a Donington 41-seat luxury coach body on a Leyland Tiger Cub chassis. This has been restyled to incorporate deeper and wider windows and has also been

enter operation as well as for private hire work. The body weight is 1 ton 16 cwt. Three of its standard ambulances are shown by Herbert Lomas, Limited, on Stand 95. These are the B-type ambulance body on the Bedford J ambulance chassis which was introduced last July, a B-type body on a Karrier 25-cwt. chassis and the Junior ambulance body on a Thames 15-cwt. chassis. The Bedford, which is for Cheshire County Council, has the Lomas patent easy loading tray on the nearside and the instantaneous seat and stretcher platform on the offside, with provision for additional top stretcher equipment if desired. The Karrier, which is destined for service in Croydon, has a nearside permanent stretcher bed and a convertible seat and platform on the offside, and the Junior, for Great Yarmouth, takes two lying

(Continued on page 23)



Complete
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CONNOLLY BROS (CURRIERS) LTD., Chalton St., Euston Rd., London, N.W.1. EUSTON 1661-5



design - brilliant!



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WILLOWBROOK LOLINE



See the wide roomy door.
So easy and quick for
exit and entry. A low
step and spacious plat-
form. Just what's needed
on busy routes.



This lightweight bus of all metal construction and built on a Dennis Loline Chassis, is one of a number recently supplied to Walsall Corporation. Extremely roomy with simple, fast passenger accessibility and complete operational reliability. 13' 7" high with a seating capacity for 74 passengers (this design can be adapted to seat 76 passengers).

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Tel: Loughborough 4541



A DUPLÉ GROUP COMPANY

See the 1961 Duple and Willowbrook coaches and buses on STANDS 35, 36, 38,
COMMERCIAL MOTOR EXHIBITION • September 23-October 1



INTEGRAL ROAD TANKER

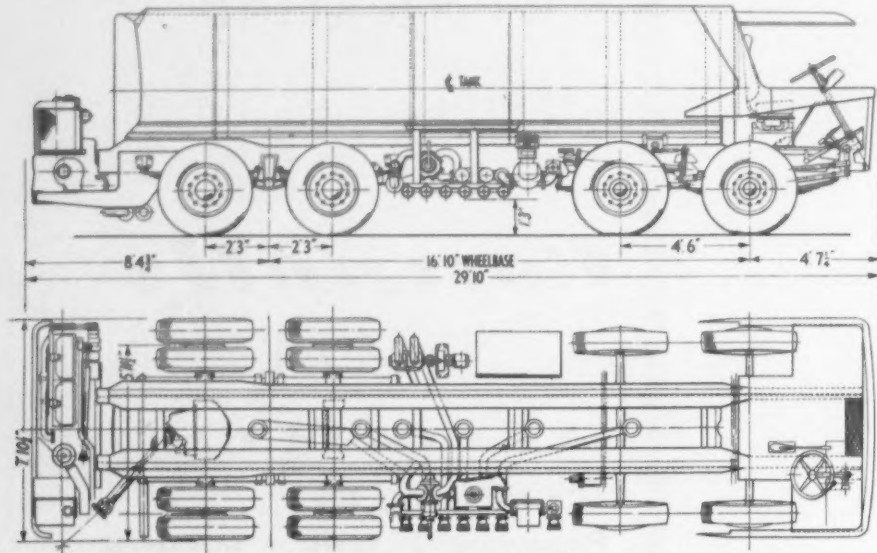
Thompson Structure—Leyland Units

FIRST OF SERIES FOR BRITISH PETROLEUM

FIRST of a new series of road tankers built to the specification of the British Petroleum Co., Limited, which has aimed at significantly advanced efficiency in the carriage of petroleum products and stability and riding qualities in the vehicle, is exhibited on the stand of Thompson Bros. (Bilston), Limited, at Earls Court. The vehicle, named B.P. Autotanker, is a bold and imaginative design, which takes advantage of many of the latest advances in commercial vehicle technology, such as integral construction, rear engine

main loads are not transmitted to the panels of the tank. At the front, the lower runners are extended to carry the cab structure and front-axle shackles, while extended lower runners at the rear support the engine-transmission-radiator group. The lower runners are 8 in. deep generally, but are increased to 10 in. depth over the single driving axle and at the points of attachment of the underslung engine-mounting brackets.

Externally, the panelling is continuous overall from front to rear and down to the skirt, apart



General-arrangement drawing of the Autotanker giving principal dimensions

position, semi-automatic transmission and leaf-air front suspension. The prototype is a four-axle vehicle for 24 long tons gross weight, with a capacity of 4,000 Imp. gal. in a six-compartment tank. At the end of the Commercial Motor Show, it will go into service with British Petroleum Company's Danish associate, B.P. Olie-Kompagniet A.S.

Design and development of the new vehicle have been entrusted by B.P. to Thompson Bros. (Bilston), Limited, for the tank and structure and to Leyland Motors, Limited, for the running units. The basic tank-chassis-cab structure is made completely of aluminium alloy, Argonarc welded throughout. Rigidity is provided by welded-in box-section runners, with box-section stiffeners welded to the compartment divisions, so that the

from apertures for the wrap-round windscreen and cab side windows. There are no cab side doors, access being through a door at front centre of the cab below windscreen level. The six tank compartments are quite separate, as the vehicle is intended to handle a variety of products. The unit is designed for open filling and gravity discharge to the side opposite the driver, but provision is made for the fitting of bottom pressure-loading equipment and discharge connections on each side.

Optical Rear View System

Running from front to rear on top of the main body of the tank is a walkway for access to the manhole lids. Built into the walkway is a tube

housing a periscope rear-view system, specially designed and built for the vehicle by Barr and Stroud, Limited. This is said to provide a 40-deg. cone of sight from 3 deg. above the horizon down to within 5 ft. of the rear of the vehicle, with a display on a mirror in the conventional position inside the cab.

The running units of the vehicle have been designed and developed by Leyland Motors, mounted for proving purposes in a newly developed rear-engined four-axle chassis frame, named Dromedary by Leyland. The power unit is the new Power-Plus 0680 vertical diesel engine, which develops a net installed output of 200 b.h.p. at 2,200 r.p.m. and maximum net torque of 548 lb./ft. at 1,200 r.p.m. The engine is mounted in unit with a Leyland automatic friction clutch and four-speed Pneumo-Cyclic gearbox transversely at the rear of the vehicle.

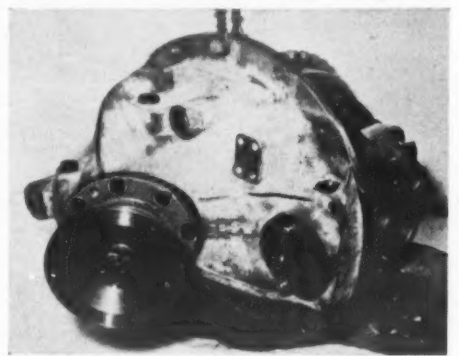
Considerable development work had already been carried out on the necessary angle drive between the transverse engine-transmission and the rear-most axle by Leyland Motors, Limited, and Eaton Axles, Limited, in connection with the Atlantean rear-engined double-deck bus. This experience has been embodied in the 48-deg. angle drive axle now developed for the Autotanker, which is a two-speed unit, providing ratios of 4.09 and 5.56 to 1, based on the Eaton 22500 series. The resultant transmission thus provides eight gears, with clutchless electropneumatic control of the main gearbox and separate electric control of the axle gearchange. The combination is said to provide fully laden performance from a gradient ability of 1 in 6 to sustained cruising speed of 50 m.p.h.

Leaf-Air Front Suspension

The rear bogie comprises driven rear and un-driven forward axles mounted in the latest Leyland non-reactive bellcrank arrangement. The rear position of the mechanical units tends to reduce the differential between laden and unladen conditions, so that conventional suspension has been found satisfactory. A desire for constant riding characteristics despite the wide variation in loading of the front bogie has led to the adoption of the Leyland system, of leaf-air suspension, which employs the main leaves of conventional semi-elliptic springs and Dunlop convoluted air bellows in combination,

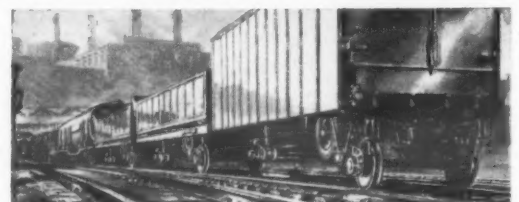
using four such units for the two front axles. It is claimed that numerous problems associated with matching the characteristics of the leaf springs and air bellows to load requirements, have been effectively solved. This probably represents the first application of this form of suspension to a vehicle with twin-steering axles.

The Autotanker has diaphragm actuated air-pressure brakes on first, third and fourth axles only and the handbrake, mechanically linked to the bogie brakes, has air servo assistance in common with the new Leyland heavy-duty goods range. Hydraulic assistance for the cam- and double-roller steering is standard. A Dowty hydraulic cargo pump is driven from the engine and a steel fire-screen is fitted between engine and tank proper.



Leyland-Eaton rear axle driving head assembly with 48-deg. angle drive

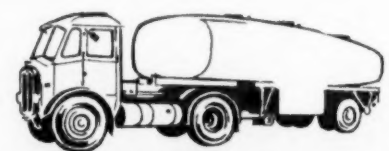
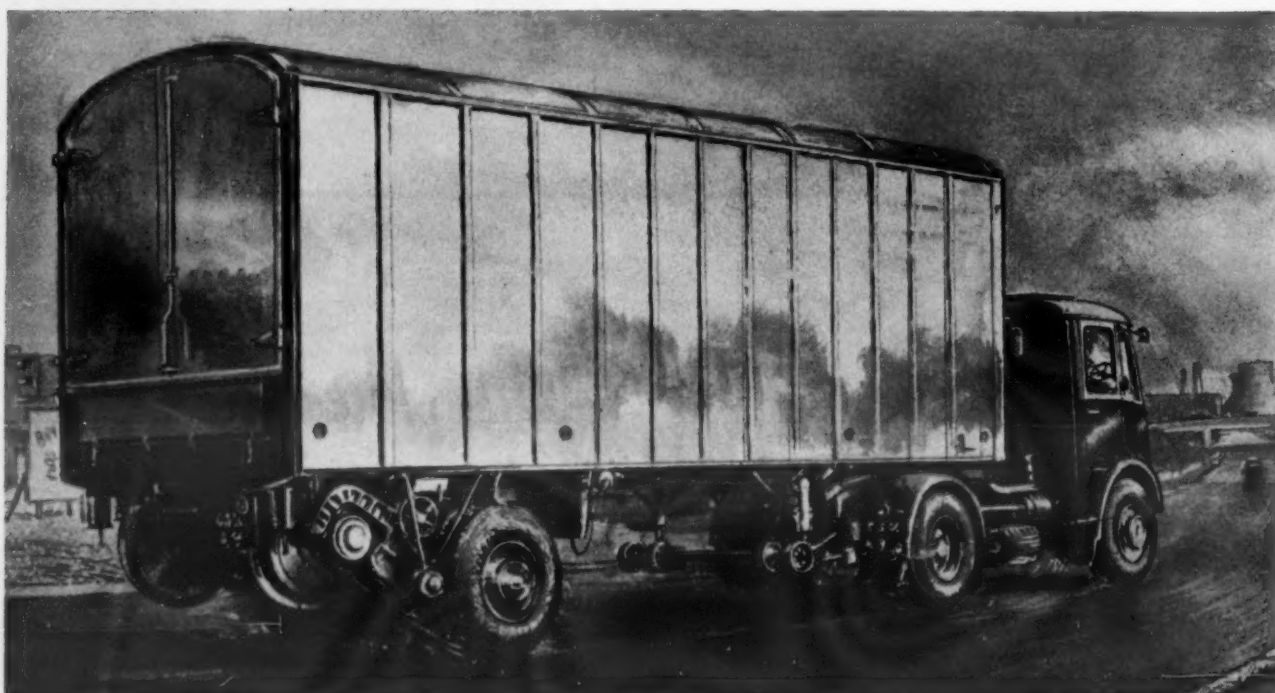
The combination of rear engine, which eliminates the front-to-rear propeller shaft, and integral construction has resulted in a much lower centre of gravity and an overall height said to be 2 ft. lower than a conventional 4,000-gal. tanker. A significantly lower tare weight is also claimed and although no weights are given, it is said that 70 per cent payload fully laden has been achieved.



Make your door-to-door transport service more profitable with the new ROADRAILER

The Roadrailer, jointly developed by Pressed Steel Company and British Transport Commission, and made by the Pressed Steel Company, is a door-to-door form of freight carrier completely new to Britain. It is a combined road/rail vehicle with road wheels and rail wheels which can be interchanged in moments. It has its own traction unit, so that you can use it on the road as a van, or as a tanker, a tipper, or a flat truck with detachable sides. Put its rail wheels down, and it can become part of a freight train. The Roadrailer is designed for use with existing heavy duty prime-mover vehicles.

The Roadrailer has combined the advantages of the railway's cheapness and speed for the long hauls; and you can run your freight straight into the unloading bays of its destination without the inconvenience and expense of intermediate handling. This makes possible—and profitable—an overnight service to any part of the country.



A Roadrailer Tanker



A Roadrailer Flat Truck



A Roadrailer Tipper Truck

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HORIZONTAL GARDNER 6LX

Fitted to Scammell Trunker

DEVELOPED by Norris, Henty and Gardners, Limited, from the highly successful current vertical 6LX engine to meet a demand for it in freight and passenger carrying road vehicles and rail cars, is a new horizontal six-cylinder 6HLX diesel engine. The specification and construction closely follow that of the 6LX, but certain modifications have been necessary to permit operation in the horizontal position.

Cylinder heads are basically of the same design as those used on the 6LX engine but embody modifications promoting suitable coolant flow and discharge characteristics for horizontal operation; a suitable manifold for the return of valve gear lubricant to the crankcase arranged on the lower wall of the valve chambers; and valve covers embodying a joint of special construction to ensure durability composed of synthetic rubber.

Decompression is effected by a simplified thumb-operated lever. Cooling water outlet can be located either at the flywheel end or forward end of engine.

The fuel pump, cam boxes and governor case differ in detail only to suit lubrication requirements in the horizontal engine. All moving parts are the same as those used in the vertical engine.

Fuel-Injection Pump

The fuel-injection pumps are of similar construction to those of the vertical engine but embody additional fuel volume chambers on their upper side together with a modified control arrangement for the operation of the starting fuel device. The crankcase is identical to that used in the vertical engine with the exception of certain oil drain holes drilled through the lower internal webs, together with an oil feed hole to supply the flywheel end camshaft bush.

The sump is of entirely new design and is in two parts, a wet and a dry section. The wet portion carries the main oil supply of 5½ gal. at maximum level. Oil is drawn from this section and pumped to the various engine components, as in the vertical engine. Oil then drains down through a long narrow coarse gauze screen into a trough in the lower edge of the dry sump. From there a transfer pump, built in tandem with the main oil pressure

pump, returns the oil into the wet sump. On the wet or oil-containing section of the sump is mounted a spring-lid oil filler, dipstick, crankcase paper-element breather and the lubricating oil delivery filter. The delivery filter is also fitted with a paper element which is spring loaded on to its seat so that in the event of filter stoppage the element can lift, bypassing the oil flow.

The flywheel and crankcase endplate are similar to their counterparts in the vertical engine but smaller in diameter. The endplate is of the flanged type suitable for bolting to the clutch housing in unit construction arrangements of engine and gearbox.

Flexible Mountings

Fuel filter and feed system equipment comprises a modified Amal diaphragm-type feed pump delivering to a fuel-air separator chamber incorporated above the injection pumps and feeding the injection pump through the standard second filter mounted on the offside of the engine. The mounting of the engine-gearbox unit or engine unit to chassis or underframe is effected by one point at the flywheel end and two points at the forward end comprised of a link arrangement permitting free oscillation of the engine about its natural axis. There is a separate torque-reaction member with hydraulic damping.

For vacuum servo-operated brakes, a large-capacity single-cylinder exhaustor of high efficiency can be incorporated at the forward end of the engine. The reciprocating piston is driven from a crank mounted on the end of the valve camshaft. For air-pressure braking, provision is made to carry proprietary makes of compressors on the forward end of the dry sump.

For arduous duty and/or operation in high ambient temperature, an oil-cooler pump can be fitted on the timing-case cover.

The 6HLX engine has a bore of 4½ in. (120.6 mm.) and stroke of 6 in. (152.4 mm.), giving a swept volume of 638 cu. in. (10.45 litres). It develops 150 b.h.p. at 1,700 r.p.m. and 485 lb./ft. torque at 1,000 to 1,100 r.p.m. Weight, less electrical equipment, is about 1,730 lb.

Passenger Vehicle Bodywork

(Continued from page 21)

patients, or one incumbent and four sitting cases. A prototype of the J-type general purpose ambulance on an Austin FG200 chassis figures in the demonstration park.

The activities of Marshall Motor Bodies, Limited, are widespread and Stand 45 displays both freight and passenger vehicles. The latter include large and small units, of which the largest is the Marshall-Mulliner metal-framed body seating 63 passengers for service in Lagos. A substantial number of units of this type has already been exported and the specially designed metal frames have stood up well to the arduous conditions. The chassis is a Guy Victory with Gardner 5LW engine. It has an overall length of 35 ft and a width of 8 ft. As may be seen from an illustration on page 21, it has two doors. Much smaller is the special p.s.v. conversion of the Commer ½-ton van. A semi-transparent one-piece glass fibre moulded roof is fitted instead of the standard all-metal roof, a move which makes possible installation of more luxurious seating while adhering to headroom regulations. In the demonstration park are a Marshall-Mulliner 42-seat service bus on a Bedford SB chassis and the Buset conversion of the Bedford 15-cwt. van which makes it a 12-seater. Another builder known for a long time for its small passenger vehicles is

the upper saloon is by wide stairway and landing.

Another group with adjoining stands is the P.R.V. Group Body Sales Division. That of Park Royal Vehicles is No. 40 and that of Charles H. Roe, Limited, No. 41. The combined stand has three double-deckers all with fluorescent interior lighting, namely the Roe-bodied Atlantean for Trent and Guy Wulfrunian for West Riding and the forward-entrance Bridgmaster for South Wales Transport with A.E.C. running units. The Atlantean, incidentally, also has an illuminated exterior advertisement panel on the offside. Modifications to the Bridgmaster include the fitting of Auster vents to the front window on the upper deck and the nearside bulkhead window on the lower deck. In addition, Beclawat Simslide windows have now been fitted. The A.E.C. Reliance coach for East Kent which also figures on the stand has had mainly detailed modifications, although some such as the heavier bumpers and the heavier type of front grille are naturally noticeable. Other examples of Park Royal bodywork are the 73-seat front-entrance Wulfrunian on the Guy stand (55) and the London Transport RM type bus on the A.E.C. stand (80).

The standard luxury coach of Plaxtons (Scarborough), Limited (Stand 34), for 1961 has been



The Roe-bodied Guy Wulfrunian for West Riding Automobile Co., Limited, and one of the Alexander-bodied Leyland Titans for Glasgow Corporation

Martin Walter, Limited (Stand 52), and this year it displays its redesigned Utilabrike Special 12-seater on a Bedford CAL chassis, while the Utilabus 12-seat public service vehicle is in the demonstration park. An interesting bodywork feature in the gallery at Earls Court is on the stand of Metal Sections, Limited (421). It is a completely erected skeleton framework for one of the modified Midland "Red" C.5 coaches which are used on the M1 services of that operator.

Large Capacity Vehicles

As is usual on these occasions the two constituents of the Metropolitan-Cammell-Weymann organisation occupy adjacent stands (42 and 43). The former has a Weymann-built Leyland Tiger Cub for Edinburgh Corporation and a forward-entrance Leyland Titan PD2 for Halifax Corporation. The Tiger Cub, which seats 47, has fluorescent lighting unlike some of the earlier vehicles of this type which were supplied to Edinburgh. Length of the Titan is 27 ft. overall and it is a 64-seater. The doors are direct air operated double jackknife type with G. D. Peters gear. Stand 43 has two Metropolitan-Cammell products. One is a normal height Leyland Atlantean for Sheffield Transport Department. This seats 77, a capacity which may be compared with that of the Leyland Royal Tiger Worldmaster for Madrid which has an overall length of 35 ft. 7 in. and seats only 28 passengers, there being a very large area for standing passengers. Reference should also be made to the M.C.W. body which appears on the Daimler stand (No. 67).

It has been designed to take full advantage of all the special features offered by the Fleetline chassis. It is a full 78-seater vehicle within an overall height of 13 ft. 4 in. suitable for both high and low bridge operation, and featuring flat floors in both saloons. A low step free entry platform gives direct access to the lower saloon, access to

developed from the Consort designs produced in quantity over recent years. Named the Embassy it incorporates a new pillar contour which provides for the side windows to lean inwards towards the top, giving increased vision and a new external appearance. Internal changes comprise a new seat design with the cushions mounted on Vitaweb resilient platforms (patent applied for), which give a much softer ride, and twin knee recesses in the backs of the seats, adding to the leg room. In addition an improvement has been achieved in the heating, ventilation and demisting of the front of the saloon. Twin dual heaters mounted behind the dash panels having separate saloon outlet ducts to rear and offside, at floor level. The latest development of the very successful Panorama long-distance touring coach, which is of necessity a front-entrance vehicle with an inward-opening hinged door, incorporates most of the new Embassy features both as regards general design and passenger comfort. Embassy bodies appear on Leyland Leopard and Bedford chassis and the Panorama on an A.E.C. Reliance.

Particular interest attaches to one of the ambulances being shown by Wadham Brothers (Coach-builders), Limited, on Stand 98. The entire bodywork is formed from polyester resins, reinforced with glass fibre. A double-skin technique employs a number of steel inserts integral with the mouldings and affords the required strength and rigidity. The body is mounted on a Morris LD2 chassis with Dunlop Pneuride air suspension. Both coaches on the stand of W. S. Yeates, Limited (33), are of the newly introduced Fiesta model, one being on an A.E.C. Reliance and the other on a Commer Avenger chassis. The introduction of larger side windows in forward sloping pillars and an increase in the windscreen area has altered the appearance of the coach, but the proven light-alloy main structure has been retained, certain of the sections having been specially developed.

specialised transport needs a specialised chassis

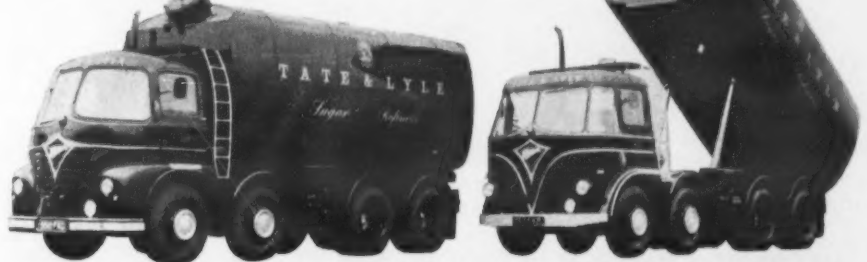


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Commercial Motor Show, Earls Court, Sept. 23-Oct. 1



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NEWS FROM ALL QUARTERS

New Tyne Bridge Approved

The Minister of Transport has agreed that a new crossing is necessary to replace the ageing suspension bridge linking Scotswood, at the western end of Newcastle upon Tyne, with County Durham. The new bridge will be built alongside the existing one and building will start, with the aid of a Government grant, within about two years.

Reconstruction of Hard Shoulders on M1

Work has begun on the reconstruction of the grassed hard shoulders on the M1 motorway. At the same time, these hard shoulders will be widened from 8 ft. to 10 ft. The work will be carried out by the contractor for this part of the motorway, John Laing and Son, Limited. Experiments were carried out earlier this year to determine the best method of reconstructing them.

Chepstow By-Pass Pressed

Gloucestershire Highways Committee has decided to support Monmouthshire County Council in making representations to the appropriate quarters for the early construction of a south-eastern Chepstow by-pass. The counties have based their appeal on the grounds of traffic conditions in Chepstow, and the industrial needs of the Forest of Dean.

New Road for New Factory

The first length of the proposed Speke-Widnes road, which will provide access on the south side to the new Ford factory at Halewood, near Liverpool, is estimated to cost £140,000. This was stated recently by the chairman of the Lancashire Highways and Bridges Committee. An extension to the Speke Boulevard will be provided by the first length which will connect with the Liverpool-Widnes road. The committee approved the extension subject to receipt of the Ministry of Transport grant.

Retention of Train Service Recommended

The Transport Users' Consultative Committee for East Anglia announced last week that, after hearing of proposals of the British Transport Commission—and objections to them—at Aldeburgh, it had decided to recommend to the Central Transport Consultative Committee that the Saxmundham—Aldeburgh line remain open to passenger trains for a period of five years, having in mind the constructional work shortly to commence at Sizewell; a nuclear power station is to be constructed.

Railway Car Ferry Charge Reductions

Charges for cars on the railway-operated cross-Channel ferries are to be reduced for five months of the year. This has been announced by the Southern Region. With the French Railways and the Belgian Marine it is reducing the fares for accompanied cars by about 20 per cent on all the car ferry routes operating from Dover, and on the Newhaven—Dieppe route when it is running. The cheap rates will be offered between October 15 and March 15 to motorists travelling with their cars. With considerable tonnage now available it is hoped to encourage winter traffic.

New South Wales Transport

The New South Wales State Treasurer, Mr. J. B. Renshaw, introducing the budget, said he was aiming at a surplus of £A.22,000. Railway operations were expected to show a deficit of £A.1,860,000 and trams and buses a deficit of nearly £A.3 million.

Soviet Aid for Foreign Railways

The Soviet Union is to help Guinea reconstruct a railway from Conakry, the capital, to Kankan, about 410 miles inland, according to the Soviet news agency Tass. The present metre-gauge line would be rebuilt to a wider gauge. It was also reported that Soviet railway engineers would start survey work in the mountains of North Eastern Iraq at the end of this year on a new line to be built between Kirkuk and Sulaimaniya, near the Iranian frontier.

Newport Proposes Second Bridge

Newport Town Council has approved in principle a £1½ million plan for a second river bridge over the River Usk, in the George Street area of the town. The council is to apply to the Ministry of Transport for a grant towards the scheme, while a deputation may also meet the Minister to discuss the matter. The bridge will be 38 ft. above high water at spring tides and will have a dual carriage-way. Suggestions that a Bailey bridge, or a bridge with a 6d. toll on it for every vehicle that crossed, were rejected on the grounds of cost.

Antiquity Has its Uses

Partly because of the "Emmet" value of the present rolling stock, Brighton Entertainments and Publicity Committee has turned down a suggestion that new cars should be provided for the seafront Volk's Electric Railway. "In this age of speed and streamlined vehicles the present railway, with its unhurried pace, rolling stock of antique appearance and Spartan comfort, provides a unique attraction for holidaymakers," says a report. The committee has decided not to acquire new glass fibre and cast aluminium coaches, and is advising the council to patch up the present nine coaches so that they will last for another five years.

L.M.R. Stations to Close

The London Midland Region of British Railways has announced that three stations will be closed on and from October 3. Pendlebury, between Manchester Victoria and Atherton Central, will be closed for passengers and parcels traffic, and parcels and passenger-train merchandise will be dealt with at Swinton. Formby goods depot, between Liverpool Exchange and Southport, will be closed for all goods traffic except that dealt with through private sidings. Facilities for dealing with horse box and prize cattle van traffic by passenger train will also be withdrawn. Alternative arrangements have to be made for dealing with freight traffic at Southport Kensington Road or Hightown and horse boxes and prize cattle vans by passenger train at Marsh Lane and Strand Road or Southport Chapel Street. Edmond Thorpe and Wymondham goods depot will be closed for all traffic.



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SEPTEMBER 25—OCTOBER 1

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COMMERCIAL AVIATION

I.C.A.O. Team to South East Asia

M.E.A. COMETS EARLIER

A TEAM versed in aeronautical communications, air traffic services and aeronautical meteorology has been assigned to the South East Asia Region by the International Civil Aviation Organisation to provide on-the-spot help and advice to states in the area, and to report on measures needed to produce long-term improvements in the existing regional network of air navigation services and facilities. At key points along the main air routes of the region, the team will visit the installations, observe the layout and use of equipment, the day-by-day working methods and any difficulties being experienced in providing efficient services. Moving from station to station along the network, the members should be able to eliminate troubles at any station caused by lack of co-ordination with services in a neighbouring country. Difficulties of this nature which the South East Asia regional team is expected to help overcome include the unsatisfactory operation of the aeronautical fixed telecommunications network, and in particular the excessive time which it takes for messages to be transmitted over this network. There is also unsatisfactory operation of the aeronautical mobile telecommunications services, due mainly to inefficient network operation, sub-standard performance of the air traffic services in a number of flight information regions in the area and an inability of many aeronautical meteorological services to meet the requirements of jet aircraft operations.

M.E.A. Comets to Start in November

Following agreement with British Overseas Airways Corporation, Comet services by Middle East Airlines are to start on November 1 next—two months ahead of schedule. This is the result of the chartering by M.E.A. of two Comet services weekly between London, Beirut and Dhahran. The first service will leave London on November 1 and after that regular round-trip services will continue every Tuesday and Sunday. The Tuesday services will go via Rome and Athens to Beirut and Dhahran and the Sunday services will fly to the same destinations via Geneva and Athens. The aircraft will bear M.E.A. markings and, as the charter continues until the end of March, 1961, it will cover the introduction of M.E.A.'s own Comets into commercial service. The first of the M.E.A. Comet 4Cs is due to be delivered on December 15 and to start regular services on January 6.

More Jet Flights to Australia

B.O.A.C. and its partners, Air India and Qantas, will together offer a total of 11 flights a week in each direction between Britain and Australia from October 31. From that date a sixth B.O.A.C. Comet jet service is to be introduced on the route. The three airlines, operating Comets, 707s, Rolls-Royce powered 707s and Super Constellations, between them serve 25 cities on the route between Britain and Australia, including Perth, Brisbane, Darwin, Sydney and Melbourne.

New I.A.T.A. Handbook

Guidance to airlines fighting high maintenance and overhaul costs is provided in the first instalment of a handbook on production planning and control, just published by the International Air Transport Association. The handbook has been developed by the Production Planning and Control Group (P.P.C.) of I.A.T.A. to help member airlines improve efficiency in maintenance and overhaul through the application of industrial planning techniques. Its keynote is guidance to the airlines, rather than standardisation. The four initial chapters of the handbook deal with P.P.C. in general outline, terminology, material planning and production performance analysis. Additional chapters will be issued during the coming year. The general outline defines P.P.C. objectives and scope in the airlines and lists some of the major principles, common practices and problems as well as possible areas of future development. Because it is imperative that airlines have a common understanding of terms, the chapter of terminology is the cornerstone of the handbook, and provides a review of the standard terminology to be used in P.P.C. inter-airline discussions and comparisons. To assist planners in the provisioning of spares and materials, a chapter of material planning treats such items as provisioning formulae, the proper selection of range and quantities of spares and the selection and training of staff in inventory control.

British Traffic in April

During April, 1960, capacity ton-miles offered by United Kingdom airlines on their scheduled services increased by 23.2 per cent and total traffic carried rose by 26 per cent; freight ton-miles increased by 7.8 per cent and mail ton-miles increased by 23.7 per cent. 445,840 passengers were carried, or 40.3 per cent more than in April, 1959, and these passengers travelled 296.5 million passenger-miles, or 31.8 per cent more. The overall load factor rose from 59.8 to 61.2 per cent. During the period April 1-30, capacity operated on B.O.A.C. scheduled services went up by 19.2 per cent compared with the period April 1 to May 2, 1959—capacity on Western routes increased by 36 per cent and on Eastern routes by 6.3 per cent. Total traffic carried rose by 34.1 per cent on Western routes and 14.1 per cent on Eastern routes. The total of 57,586 passengers carried by B.O.A.C. was 32.9 per cent more than during April, 1959, and these passengers flew 170.3 million passenger-miles, or 27.9 per cent more. The overall load factor rose from 56.5 to 58 per cent. British European Airways offered a total of 24.6 per cent more capacity on scheduled services than in the same month of 1959; capacity on international services increasing by 20.5 per cent and on domestic services by 39.3 per cent. Total traffic carried rose by 26 per cent. 181,166 passengers, or 27 per cent more, travelled on international routes and 131,871 or 34.1 per cent more travelled on domestic routes. The overall load factor rose from 65.6 to 66.3 per cent. The independent companies operating in association with the corporations provided 20.9 per cent more capacity ton-miles on scheduled services in April, 1960, than in April, 1959; international capacity showing an increase of 13.6 per cent and domestic capacity showing an increase of 106.1 per cent. International freight traffic went up by 3.2 per cent while domestic freight rose by 128.3 per cent. Passengers carried totalled 75,217 or 107.1 per cent more, and these passengers flew 15.7 million passenger-miles or 48.1 per cent more. There was an increase of 112.7 per cent in the number of passengers carried on international routes and an increase of 91.8 per cent on domestic routes. The overall load factor rose from 65.8 per cent in April, 1959, to 68.9 per cent in April, 1960.

GOOD VEHICLES DESERVE GOOD ROADS



A Message from Mr. D. O. GOOD, Chairman of the National Road Transport Federation

.....

● Transport seems always to be the subject of controversy, and a favourite target for attack is the commercial vehicle operator. It is a pity that some of the critics do not visit the show at Earls Court to see what operators are doing, in conjunction with manufacturers, to solve for themselves the many transport problems that continually arise.

● British trade and industry do not have to be told how much they owe to road transport. They know that they will not be let down, although the operators of their vehicles have to carry out their task within the limitations of a road system that with few exceptions was designed to carry last century's traffic.

● The people in road transport have accepted the unfavourable situation as a challenge rather than as an excuse for doing nothing. Vehicles have been designed to carry the maximum load, whether of passengers or goods, while taking up the minimum of space on the congested highways. This has been an invaluable service to the community and one that should be more widely recognised by the critics.

● When the better roads are there—and there is no gainsaying that they must be provided and provided quickly—the road transport industry will be able to show even more decidedly than now what achievements are possible with the improvements that are being made all the time in the power and efficiency of road vehicles.

● In the meantime road transport operators, both of passengers and of goods vehicles, represented by the three constituent organisations of the National Road Transport Federation, welcome the opportunity that the Earls Court Show provides of paying a tribute to the manufacturers and other suppliers who serve them so well.

D. O. Good

NEW SIX-SPEED GEARBOX

David Brown Unit

ON SHOW AT EARLS COURT

A NEW six-speed gearbox, developed by the David Brown Automobile Gearbox Division, Park Works, Huddersfield, for commercial and passenger vehicles with a maximum engine torque of 480 lb./ft., is the centrepiece at the company's stand at Earls Court. Availability of a sixth speed enables the ratios to be ideally suited to all conditions and gives greater all-round flexibility than has been possible with the more conventional five-speed unit. With the overdrive top ratio of the two models offered, higher maximum speed can be obtained without sacrificing economy and while retaining the desirable close spacings of the lower gears.

Designated the 657 model, the new unit is equipped with constant-mesh single-helical gears for all forward speeds. A compact forward-control unit is provided with the control rod carried on two universal joints, an arrangement which offers considerable flexibility of layout and provides substantial tolerances in assembly. The gearbox can easily be adapted for right-hand or left-hand drive vehicles, adding still further to its versatility and appeal. Gearshafts are arranged horizontally, and this permits the use of an exceptionally shallow casing which in turn provides maximum ground clearance and low, uninterrupted floor level.

Variable Housing

Suitable for either unit or midship mounting, the 657 gearbox has a large facing at the forward end to accommodate a bell housing in the unit arrangement. When the box is mounted amidships, the facing bolts on to a transverse bearer built into the chassis. This arrangement, together with the support provided at the rear end of the box, gives what is virtually a three-point mounting. The forward-control unit is suitable for either form of mounting. With its control, which includes two universal couplings, this unit offers considerable latitude in layout and assembly. It is alternatively available with centre control.

The aluminium case is made in halves and the upper portion can be removed without disturbing the internal mechanism. The proportions and disposition of the ribs, together with the additional support provided by the intermediate wall of metal carrying the centre bearings, combine to give exceptional stiffness and freedom from resonance. All gears are of high-quality nickel chrome case-hardening steel. In addition to carrying the reverse gear, the reverse shaft includes a spur gear which provides the p.t.o. drive.

Tooth forms are of 20 deg. pressure angle with proportions corrected to give maximum strength and durability. Profiles are also modified from the true geometrical involute to avoid tip interference under heavy load. All shafts are of high-quality nickel chrome steel, case-hardened and ground on locating diameters. The intermediate wall in the case supports a centre bearing for the layshaft and provides independent support for the final shaft.

Primary Shaft

The primary shaft is carried on a roller bearing and a location bearing is provided to take the axial load from the single-helical gears. The layshaft is supported on three roller bearings, and an additional duplex thrust bearing is fitted to take end thrust. The front end of the mainshaft is carried on a roller bearing and on a deep groove ball bearing at the rear end. Roller bushes, each with two rows of large rollers, are fitted to the loose mainshaft gears and the reverse shaft is carried on two tapered roller bearings.

All the bearings have an ample margin of safety and, where supported in the aluminium case, are housed in steel liners which removes any possibility of the outer races creeping. The gearbox can be supplied with a full power p.t.o. unit mounted on the top half case where required, and provision for mounting two regular-type p.t.o. units is made. An auxiliary drive, located at the rear, is provided to take a high-pressure pump for brake operation, a clutch stop is fitted to gearboxes supplied for unit mounting.

In addition to a wide range of other gearboxes, four- and five-speed units suitable for engine torques ranging from 90 to 480 lb./ft., the company will give prominence to a recently developed range of power take-off units. These have been made available to meet the greatly increased demands for auxiliary drives. Although designed for application to specific vehicles, the units are basically suitable for a wide range of applications. Three examples are shown, designed for drives of approximately 25 h.p.

FORTHCOMING EVENTS

September 23-October 1.—Commercial Motor Show, Earls Court.
September 24.—O.S. Annual dinner, Clarendon Restaurant, Hammersmith, W.6. 7 for 7.30 p.m.
A.F. Annual dinner, Gatwick Airport.
September 25.—V.P.V.S. Vintage bus and coach rally. Red Lion, Hatfield.
September 26.—I.R.S.E. (Bristol). O.S. Nock, "Signalling from the Driver's Point of View." Bristol Temple Meads Station, 6 p.m.
September 29.—Rly.C. Visit Visit to the Archives of the British Transport Commission, 4.45 p.m.
September 30.—I.Nav. Capitaine de Frigate L. Oudet and Captain J. Poll, "The Flow of Maritime Traffic." University of Southampton Navigation School, Warsash. 4 p.m.
B.L.S. Visit to the Bitterley branch by freight train, leaving Ludlow 11.30 a.m.
October 3-7.—British Railways Electrification Conference, London.
October 6-16.—International Motor Show (including commercial vehicles), Paris.

KEY TO CODE

A.D.A.—Aluminium Development Association; A.F.—Aviation Forum; B.I.R.E.—British Institution of Radio Engineers; B.L.S.—Branch Line Society; D.E.U.A.—Diesel Engineers and Users Association; E.R.S.—Electric Railway Society; H.C.V.C.—Historic Commercial Vehicle Club; H.M.R.S.—Historical Model Railway Society; Inst.C.E.—Institution of Civil Engineers; I.E.E.—Institution of Electrical Engineers; I.N.A.—Institution of Naval Architects; I.R.S.E.—Institution of Railway Signal Engineers; I.R.T.E.—Institute of Road Transport Engineers; I.T.A.—Industrial Transport Association; I.Loco.E.—Institution of Locomotive Engineers; I.Mar.E.—Institute of Marine Engineers; I.Mech.E.—Institution of Mechanical Engineers; I.Nav.—Institute of Navigation; Inst.H.E.—Institution of Highway Engineers; Inst.P.—Institute of Petroleum; Inst.T.—Institute of Transport; Inst.Trad.A.—Institute of Traffic Administration.
L.M.R.L.D.S.—London Midland Region Lecture and Debating Society; L.R.T.L.—Light Railway Transport League; N.T.M.R.C.—Norbury Transport and Model Railway Club; O.S.—Omnibus Society; P.R.D.G.—Peterborough Railway Discussion Group; P.V.O.A.—Passenger Vehicle Operators Association; P.W.I.—Permanent Way Institution; R.Ae.S.—Royal Aeronautical Society; R.C.H.S.—Railway and Canal Historical Society; R.C.T.S.—Railway Correspondence and Travel Society; R.H.A.—Road Haulage Association; R.S.A.—Royal Society of Arts; Rly.C.—Railway Club; Rly.E.C.—Railway Enthusiasts Club; Rly.S.A.—Railway Students Association; S.C.T.S.—Southern Counties Touring Society; S.E.—Society of Engineers; S.L.S.—Stephenson Locomotive Society; S.R.L.D.S.—Southern Region Lecture and Debating Society; S. Wales and Mon. R.D.L.D.S.—South Wales and Mon. Railway and Docks Lecture and Debating Society; T.R.T.A.—Traders Road Transport Association; V.P.V.S.—Vintage Passenger Vehicle Society; W.R.L.L.D.S.—Western Region London Lecture and Debating Society; W.W.R.T.S.—West Warwickshire Railway and Travel Society.

THE PORT OF GOOLE

Trade and Present Progress*

SINCE the latter half of the 19th century coal has been the main commodity handled by the port of Goole, and it is no coincidence that 1913, the peak year of coal production in this country, was also the best year for traffic through the port. After the critical setback caused by the last war, coal class shipments made a rapid recovery and in 1953 achieved a figure that was only exceeded by that of 1913. Subsequent fuel crises and the decline in demand for coal in recent years has since caused a sharp fall in shipments, although in this respect Goole has not suffered to the same extent as some other ports.

Exports represent between 75 and 80 per cent of the traffic through the port, and some 90 per

these circumstances to build up an overall increase is necessarily a lengthy and painstaking process. Nevertheless current figures do indicate that the effort so far expended in this direction is having good results. Imports during 1959 were 47,000 tons better than for the previous year, with increases in food, iron pyrites, raw wool, timber, chemicals, potash, strawboards and lager beer. Exports apart from coal and coke showed little variation with increases in general cargo, woollen goods and grain being offset by decreased tonnages of pitch and pig iron. The loss of 107,000 tons in coal and coke against a gain of 50,000 tons in general merchandise may or may not be regarded as satisfactory, but it is certainly a hopeful sign

iron and steel, chemical fertilisers, ores, sand, timber, strawboards and wool—the latter transhipped to London. Exports (apart from coal) are principally machinery and other manufactured products from the industrial areas in the vicinity. This port is regarded as one of the best in Great Britain for the quick turnaround of vessels and also for the friendly and co-operative relationship between labour and management.

Recent Improvements

Following the transfer of the Port of Goole to the Humber Ports Group in 1950, a survey was made of the outstanding works of maintenance together with schemes of improvement and development. The first major project undertaken was the complete overhaul of the Ouse and Victoria Locks, a



The port of Goole and its waterway hinterland

This includes the maintenance of a mooring berth near the lower end of the Ouse for ships that are unable on account of tide or weather to make the complete journey from Goole to the sea and vice-versa without interruption. The state of the old



"Eskwood" entering Victoria Lock from the River Ouse preparatory to proceeding through Ouse Dock to Railway Dock with, on her right, barges bound for the Aire and Calder Navigation working through on the same opening; West Dock, Goole, looking east towards Railway Dock; right, the Everard vessel "Grit" in the recently enlarged No. 2 Graving Dock

cent of this is coal class shipments, most of which goes coastwise to the south of England. The current trend from coal to oil is not a favourable omen for the future, although with its excellent handling and quick turn-round facilities, Goole is well equipped to gain a larger proportionate share of the traffic in competition with other ports. Since 1956 coal shipments have fallen from 2,491,000 tons to 1,677,330 tons in 1959. Although serious enough, the decline of 107,000 tons in 1959 was less than a third compared with the two previous years, and augurs the possibility of a slight recovery.

Other Traffic

The unpromising outlook as regards coal has certainly drawn attention to the need for developing other sources of trade. For a considerable period traffic other than those in the coal class have remained at 20 to 25 per cent of the total—amounting to a tonnage of roughly 650,000 in 1959. This figure is, however, made up from a wide variety of commodities, often susceptible to market fluctuations that tend to cancel each other out. In

* The origin and development of the port was described in our issue of July 16.

that the port has succeeded so well in the difficult task of attracting fresh custom.

Fortunately for its future development Goole possesses a diverse and steadily expanding group of local industries, including the manufacture of fertilisers, sulphuric acid, paints, greases, tar distillation and benzole. There is also an important shipbuilding and repairing industry with facilities for building vessels of up to 350 ft. in length. During the last 60 years one firm alone has launched more than 500 vessels including a high percentage of trawlers.

The greater part of the trade at Goole is coastal and near Continental. Although vessels considerably in excess of 2,000 g.r. tons regularly use the docks, the figures for 1959 show that 2,476 ships with a n.r.t. of 1,091,061 used the port, and, therefore, that most of them were of a few hundred tons burthen. Regular shipping services ply to and from Copenhagen, Hamburg, Bremen, Delfzijl, Harlingen, Amsterdam, Rotterdam, Antwerp, Ghent and Boulogne, and there is a constant service of coastwise general cargo vessels between Goole and London.

The principal imports are provisions, fruit, vegetables, cardboard, farina and glucose products,

task that was begun in 1952 with the Ouse Lock and completed with the Victoria Lock in 1957. Other items involving work of a similar character have included the overhaul of the ship caisson from No. 1 Dry Dock.

In addition to work associated with shed development schemes, an important quay improvement has been carried out at the south-east corner of West Dock where an area of 2,000 sq. yd. has received a working surface of reinforced concrete for use as an open berth with rail access and two 3 to 7½ ton portal cranes. The docks are served by both hydraulic and electrically operated appliances, but most of the cranes are now electrically driven. To improve the coal shipping facilities at the Railway Dock and provide a mobile heavy lift cargo crane, a new 50-ton electric crane was installed on the west quay of the Railway Dock in 1958. In addition to dealing with loads of up to 50 tons this crane has a light lift of 15 tons. The maximum height of the wagon cradle above the quay is 30 ft. to enable discharge into the largest vessel that can be accommodated at the berth.

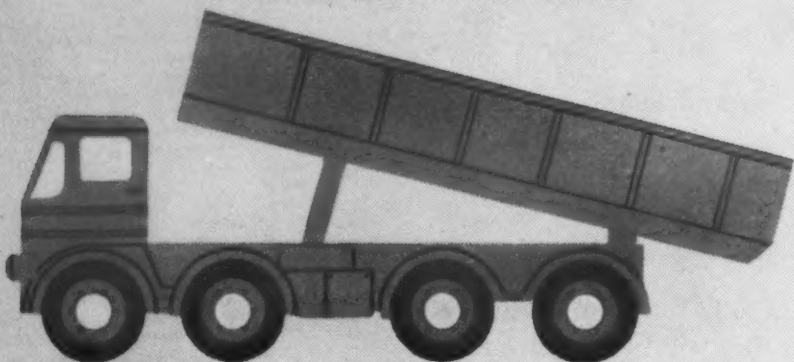
One of the features which is unique to Goole among the Humber ports is the inclusion for administrative purposes of 10 miles of the Ouse.

timber jetty was such that in 1953 powers were obtained for the construction of a replacement immediately upstream. The new jetty is of reinforced concrete with a 3-ft. thick deck 654 ft. long and 35 ft. wide, and is dredged out to give a depth of 15 ft. 6 in. at low spring tides. Ancillary work during the same period also includes an extension to No. 2 Graving Dock, two new transit sheds on Bond Island, and the general improvement of road access to the shipping berths. Future schemes provide for an extension to the main transit shed on the north side of West Dock, and the gradual changeover in stages from hydraulic to electric power.

Record and Hopes

In 1939 Goole ranked as the 13th port in the United Kingdom on the value of its imports and exports, and despite the 1939-45 war it had recovered and improved its position to 10th port by 1956. Since then times have certainly been difficult, but with the anticipated development of free trade areas and common markets in Europe hopes are high that the port will benefit from its ideal geographical position for handling Continental trade.

STEEL TIPPER



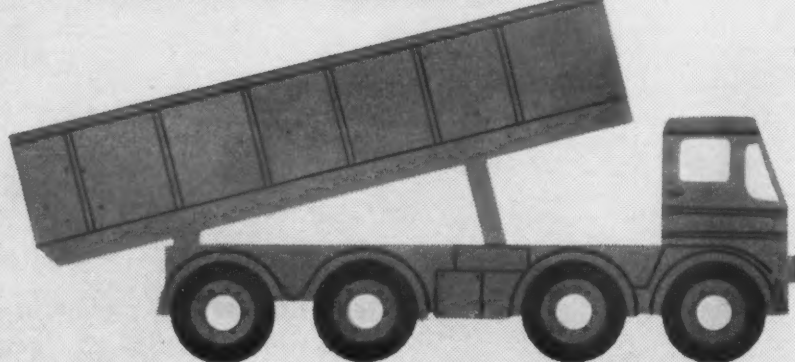
WEIGHT:

8 tons, 15 cwt., 56 lb.

CAPACITY:

15 tons, 4 cwt., 56 lb.

ALUMINIUM TIPPER



WEIGHT:

7 tons, 16 cwt., 109 lb.

CAPACITY:

16 tons, 3 cwt., 3 lb.

How a tipper takes more load . . . without putting on more weight

The steel tipper is heavier, by a ton . . . the aluminium tipper carries the bigger payload. Because aluminium is strong, but a much lighter metal than steel, the aluminium tipper can carry the much bigger payload and still keep its gross weight the same as the steel tipper's. This extra payload adds a big bonus to the operator's profits.

On a round trip, using a steel tipper, running and operating costs absorb, say, three quarters of the revenue. Using an aluminium tipper, with its bigger payload, your revenue goes up. Running expenses on full load stay as they were. On "no load" they go down.

As you see from the figures (right) your profit goes up by at least a quarter. Add the savings on fuel and tyres (because an empty aluminium tipper is a ton lighter than the steel one), and the savings on maintenance (because aluminium can't rust and damages less), and the economic argument is conclusive. To get the full facts, contact: Alcan (U.K.) Limited, 30 Berkeley Square, London W.1. Telephone: Mayfair 9721.

	STEEL TIPPER	ALUMINIUM TIPPER
REVENUE	100	106
RUNNING COSTS	75	75
PROFIT	25	31

ALCAN ALUMINIUM
ALCAN ALUMINIUM LIMITED OF CANADA
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ROBOTUG INSTALLATION

At Wolverhampton Herbert Street Goods Station

WESTERN REGION AND E.M.I. DEVELOPMENT

A RECENT innovation by British Railways in the drive for higher productivity is the installation of a Robotug system of driverless powered trolleys to handle inwards goods traffic at Wolverhampton Herbert Street goods station of the Western Region. The Robotug system has been developed by E.M.I. Electronics, Limited, in co-operation with British Railways, which first provided facilities for a pilot scheme at Newton Abbot goods shed over a year ago. The system is essentially a means of handling tonnage with less manual effort and consists of battery-

controlled by means of a walking stick tiller control which can be fitted in a matter of seconds to the steering pillar. The system is completely magnetically controlled and thus is unaffected by dirty floors and adverse weather conditions. The speed of the controlled tugs is at present 2 m.p.h., which is adequate for the operation of the present installation.

Method of Working

It will be seen from the diagram that the track layout at the Wolverhampton goods shed is U-

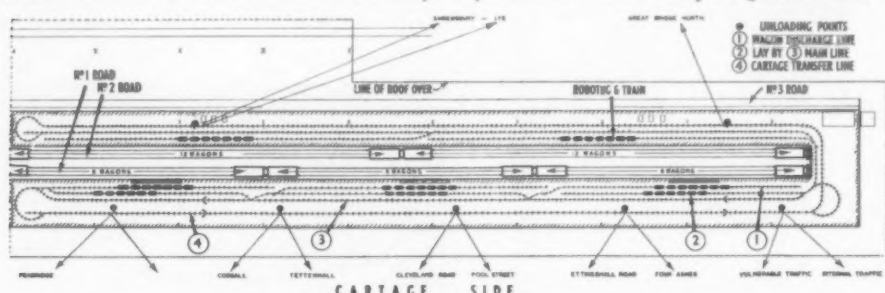


Diagram of Robotug paths on Wolverhampton Herbert Street loading deck

powered electronically-controlled units to haul loads over predetermined routes established by guide wires buried about 1-in. below the surface of the floor.

Savings and Flexibility

It dispenses with the need for trolley drivers, cuts out walking, reduces handling and combines all the best features of mechanisation for goods sundries traffic so far introduced. The extreme flexibility of the system enables it to be readily adapted to meet changing requirements, and it is claimed that the saving in labour is such that the capital cost can be recovered within a matter of months.

The present installation at Wolverhampton is the first full-scale application of the system in service. Its useful attributes could with equal facility be adapted to a wide range of purposes; it is especially well-suited to the distribution of materials in factories, for example.

Technical Details

The electronic wire guidance system operates by making a tug (or powered trolley) hauling trailers follow a single wire laid beneath the surface, the wire having an alternating current of one-sixth of an ampere of a specified frequency passed through

shaped around two platforms. The platforms are divided into sections, three of eight wagons each on No. 1 road and two sections of 12 wagons on No. 2 road. Each of the five sections has its own gang, and five Robotugs operate, each with different coloured buffer plate, one from each section. Each gang is also supplied with a 25 ft. length of lightweight movable free rollers. There are 12 programme stops in the layout; five are homing stops to the five sections of the platforms and seven are at cartage and tranship posts.

At the commencement of work each morning the tugs are taken off charge and placed on a marked spur. The homing switch number is then pressed down, the starter pressed, and the tug then proceeds to the particular gang to which it is allocated. The porters discharge the traffic from the vans on to the free rollers; next the checkers sort to the trolleys. When the trolleys are loaded the checker goes to where the tug has stopped, presses a pendant switch, puts the tug in reverse by means of a three-position switch on the starboard side and depresses the green button on the front of the tug. It then reverses along the wagon discharge line to couple up with the trolleys by means of the automatic coupling. The tug is now placed in the forward position and the switches on the programme unit put down in accordance with the



Two E.M.I. Robotug driverless trucks, hauling trains of trailers, pass on the platform of Wolverhampton Herbert Street Goods Station, where five Robotugs have been installed for inwards goods handling

it. Due to the magnetic field produced around the wire a voltage is induced in two sensing coils positioned underneath the front of the tug. This small voltage is amplified by a two-stage transistor amplifier and the resulting voltage operates the steering motor which is connected to the steering wheel through reduction gearing.

As long as the tug remains on its correct course the voltage induced into either of the two sensing coils is low and the steering control is not operated. Should it deviate from its proper course the voltage induced in one coil will increase and be sufficient to operate the steering motor and so turn the tug back on course. The steering motor is then automatically switched off. Should the current in the guiding wire fail or the tug otherwise wander off course, the starter relays will be de-energised and the brakes applied.

Safety Measures

Fitted to the front end of the tug by four springs is a safety bumper plate so that in the event of the vehicle meeting an obstruction a micro-switch will open the circuit, de-energise the interlock relay and bring it to a halt. For controlling a number of tugs on a variety of routes the track is divided into blocks similar to railway practice. The track is normally dead, so that to operate the system only the section over which the tug is passing or about to pass will be energised. Further, a dead section will always exist between each tug in operation. Each tug is fitted with an electronic programme unit which controls the selection of routes in accordance with a pre-arranged sequence of stopping points; the operator simply presses down numbered switches.

The stopping points are in sequence with the sorting arrangements, and are operated by count coils buried in the floor and energised by the main track current. By this means the programme unit is kept informed of the position of the tug in circuit. The system is completely automatic, and any fault that may occur either in the tug or the control system results in a stopping of the section until the fault is put right. In the event of a complete stoppage, the tugs, which are battery operated, can be driver controlled, or pedestrian-

loading. Finally, the Robotug proceeds on its way, automatically stopping at the cartage and transfer posts programmed.

Economical Operation

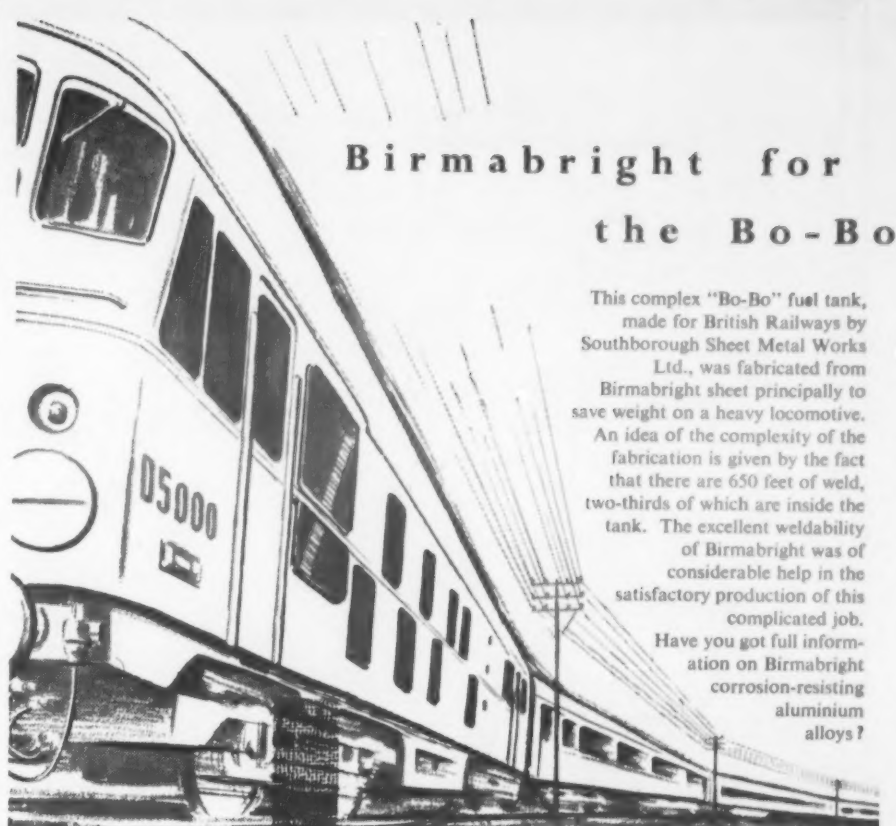
As soon as the tug halts at a programmed stop the cartage checkers concerned know that there is a trolley load for them. They next detach the trolley and press the starter; then the tug proceeds to the next programmed stop. At each stop any empty trolleys are attached so that when the process is completed it returns to its own layby with a set of empty trolleys for reloading. The cycle then recommences. In order to prevent tugs from having to complete the full circuit in order to count 12 stops, a loop line is provided in which there are four dummy stops; if no trolley loads of transfer or empties have been included the tug will take the loop line and proceed back to the homing stop.

Certain advantages of the system are that packages are received in unit trolley loads instead of singly from a slat conveyor, and that unit loads from one consignee are formulated at the wagon side. In this way split deliveries are reduced and there is an appreciable reduction of handling because the cartage checker is able to load his vehicle in accordance with delivery requirements.

BRITISH SEALED BEAM LAMPS

New G.E.C., A.E.I. and Lucas Venture

INTRODUCTION of a British sealed-beam headlamp announced by the Osram lamp division of the General Electric Co., Limited, makes this type of fitting generally available in Britain for the first time. The new units are manufactured by British Sealed Beams, Limited, Corby, Lincs, which is a joint venture by G.E.C., Associated Electrical Industries and Joseph Lucas. They are said to provide superior light in both dipped and main positions and comprise double transverse tungsten filaments sealed into an aluminised-glass reflector; which is fused to the lens, the whole forming a unified gas-filled bulb.



Birmabright for the Bo-Bo

This complex "Bo-Bo" fuel tank, made for British Railways by Southborough Sheet Metal Works Ltd., was fabricated from Birmabright sheet principally to save weight on a heavy locomotive. An idea of the complexity of the fabrication is given by the fact that there are 650 feet of weld, two-thirds of which are inside the tank. The excellent weldability of Birmabright was of considerable help in the satisfactory production of this complicated job. Have you got full information on Birmabright corrosion-resisting aluminium alloys?



Birmabright

BIRMABRIGHT LIMITED

BM 261

Woodgate Works · Birmingham 32

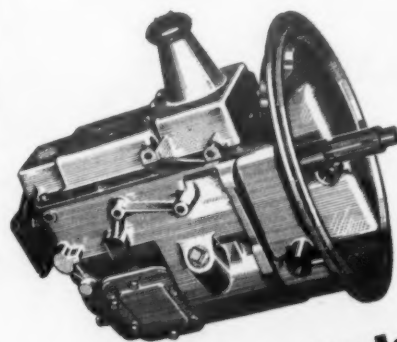
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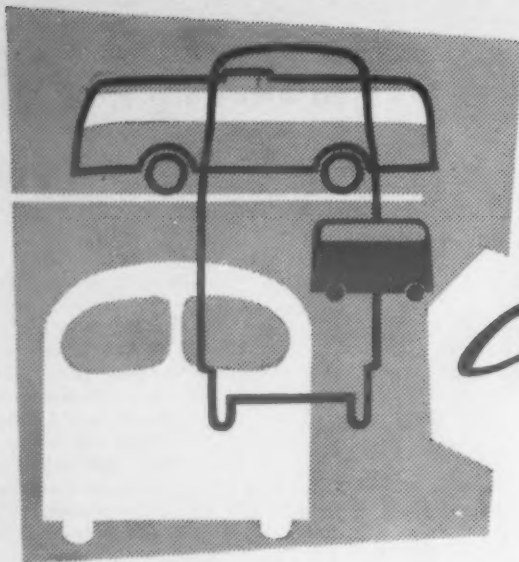
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DENSIFIED WOOD STEPS

For Long Distance Coaches

FOR the first time in this country laminated wood flooring made from beech veneers, impregnated and densified under vacuum with thermo-setting resins, is being used for the steps and step side walls on new long-distance coaches. This type of flooring has been chosen for its lightweight, non-corroding, weather resistant and rot-proof properties, which are ideal for the conditions encountered. A combination of strength and safety together with a smart, workmanlike appearance are other claimed advantages.

The material is itself strong and rigid enough to resist extreme wear and does not require extra support other than fixing mounts spaced at regular intervals. In this application, however, it is mounted to a stepwell unit fabricated from glass fibre reinforced plastics and light aluminium edging has been added to enhance the appearance of the coach entrance. The fitting was carried out by C. H. Roe, Limited, and Duple Motor Bodies,



Permatred steps on a Black and White Motorways vehicle

Limited, and several of these coaches, for Black and White Motorways, are now in operation.

This type of flooring has been used successfully for many other applications in chemical drying ovens, boats, diesel-electric locomotive cabs, London County Council school meals vans and furniture vans, all of which subject the flooring to arduous working conditions. Known as Permatred, the material is available in standard sheets 60 in. by 36 in. in thicknesses of 1/4 in., 3/8 in., 1/2 in., 3/4 in. and 1 in. Alternatively, it can be cut to size as required. Machining is easy with normal wood-working equipment. Fixing methods can be arranged to suit existing practices, i.e. through-bolts, or screws with heads countersunk or self-tapping screws may be used on the underside. For improved soundproofing, sheets are laid on thin rubber or felt strips. Further particulars may be obtained from Permal, Limited, Bristol Road, Gloucester.

NORTHERN ALUMINIUM CHANGES NAME

Now Alcan Industries Limited

AS from September 15 Northern Aluminium Co., Limited, has become Alcan Industries, Limited. This new name involves no change of ownership, manufacturing activity or sales policy. Its purpose is simply to identify the company clearly as a member of the Aluminium, Limited, of Canada enterprise—"Alcan" for short. Aluminium, Limited, with headquarters in Canada, is the world's largest producer of aluminium for international trade, accounting for about one-fifth of the whole free world primary production. It comprises some 50 companies in more than 25 different countries, engaged in all phases of aluminium production and marketing, but the heart of the business is the use of Canada's hydro-electric power resources for the efficient smelting of the bauxite mined in the tropical countries. The company's gross fixed assets exceed \$1,400,000,000 and the integrated operations they represent include mining of bauxite and other ores on four continents; generation of hydro-electric power; smelting of aluminium in six countries; and fabrication in more than 20 countries of some of the ingot into forms useful to industry. Aluminium, Limited, has sales outlets in 144 countries.

Identification

Northern Aluminium Co., Limited, was incorporated more than half a century ago and is the principal fabricating company of Aluminium, Limited, converting Alcan ingot into sheet, plate, sections, forgings, castings and other forms. It is felt that there is a need today to establish more clearly the identity of the company with Aluminium, Limited, and so to emphasise the advantages that the company and its customers enjoy in being able to avail themselves of the considerable research and development resources within the whole enterprise, as well as of the great fund of Alcan's experience in the manufacture and application of aluminium in all parts of the world. Other operating and trading companies in Aluminium, Limited, are currently changing their names for the same reasons, and the common identification is the use of the name "Alcan"—symbolising "Aluminium Limited of Canada." This stresses the Commonwealth nature of the enterprise. Associated with the name is the recently introduced Alcan mark.

The origin of the old name, "Northern Aluminium," has puzzled many people who know that the company has no plants farther north than Birmingham. In fact, this was the original name given to the parent company when first established in Canada at the beginning of this century, was used by what was then the British sales office, and has survived here until now. Over the years, the products of Northern Aluminium Company have become well known under the "Noral" mark, and Alcan Industries, Limited, proposes to continue to use this trade name.

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In 1959 — for the fourth year running — more new Thames trucks in the 2 to 10 ton range were registered in the U.K. than any other make. What a massive tribute to 6D power!

With all this — plus the backing of world-wide Ford Service — you must see and settle for Thames!

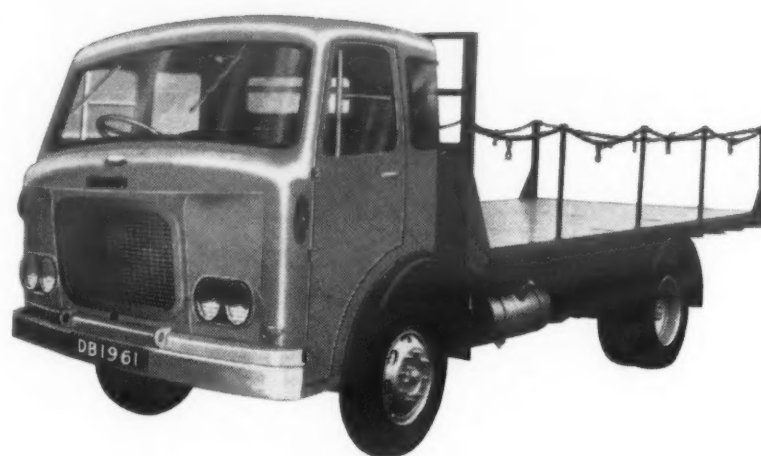


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- Conventional positioning of chassis components.
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UNDERFLOOR-ENGINE DOUBLE-DECKER

Integral Construction and Rubber Suspension

MIDLAND "RED" D10 PROTOTYPE ENTERS SERVICE

ATTRACTIVE accommodation for 78 seated passengers, an easy staircase and spacious platform have been achieved in the D10 double-deck bus designed and built by the Birmingham and Midland Motor Omnibus Co., Limited, by placing the engine under the floor. Practical

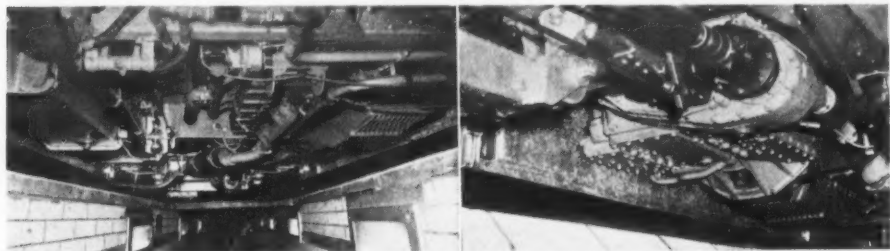
Following recent B.M.M.O. practice in both single- and double-deck bus designs, the D10 is of integral construction, comprising steel framing, steel interior stress panels solid-riveted to the frame up to waist level and panelled generally in aluminium and structural plastics. In the D10,



This handsome new Midland "Red" double-decker, D10, can seat up to 80; it features integral construction, underfloor engine, rubber suspension (independent front), disc front brakes and much resin-glass panelling

road clearances and headroom have been maintained without sacrificing the benefits of level central gangways. Other outstanding features of the new vehicle are semi-automatic transmission, disc front brakes, integral construction, rubber suspension—independent at the front—and exten-

the roof is a one-piece resin-glass moulding colour impregnated white to form a presentable interior surface as the ceiling of the upper saloon, requiring no painting. The outside of the moulding is painted in the normal way. The type of variable-rate solid rubber suspension developed jointly by B.M.M.O.



Shipshape underside showing fuel tank on left and diesel engine on right from the front and, right, the engine-gearbox-transposing-box group from behind

sive use of resin-glass mouldings, colour-impregnated in many cases to avoid the necessity of interior painting.

An important advantage of the design is that the entrance can be placed either at the front or the rear, or a front entrance and rear exit are possible, without alteration of the basic mechanical layout.

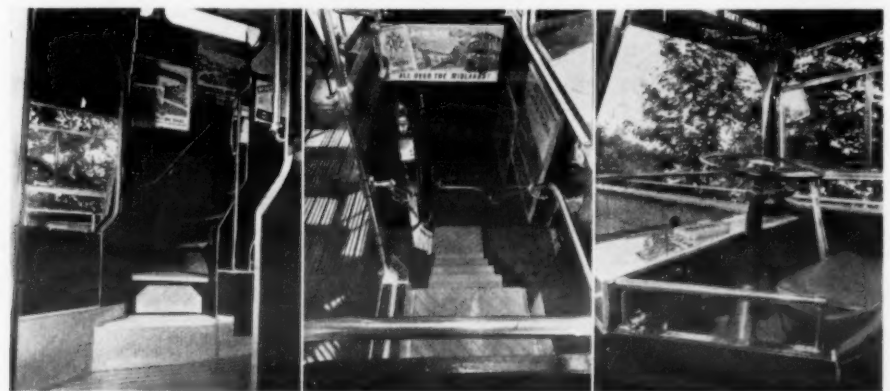
and Metalastik as long ago as 1952 for single-deck buses and coaches, is again used throughout the D10, with the front wheels independently mounted. The riding qualities of the system have been well proved and exceptional stability has been experienced even in the double-deckers so fitted at tilt angles of up to 33 deg.



Space and grace in both lower and (right) upper saloons. The lower-deck ceiling is panelled in colour-impregnated plastics mouldings, while the upper-deck ceiling is unpanelled, the high finish seen in the picture being achieved on the face of the colour-impregnated one-piece plastics roof moulding

The prototype which is just entering trial service has a front entrance covered by driver-controlled doors, but the second vehicle, now under construction, will in fact have double-width entrance at the front and single-width exit at the rear, so that any possible operating advantages of this arrangement

The D10 bus uses the B.M.M.O.-designed and built horizontal six-cylinder direct-injection diesel engine. With a bore of 4.88 in. (124 mm.) and stroke of 5.709 in. (145 mm.), giving a capacity of 10.5 litres, the engine is set to produce a derated output of 127 b.h.p. at 1,700 r.p.m. and 465 lb./ft.

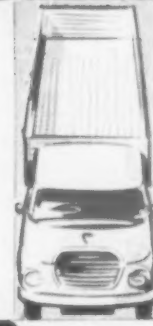
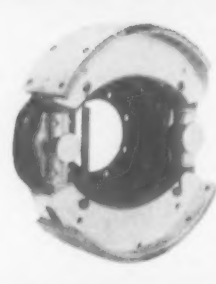
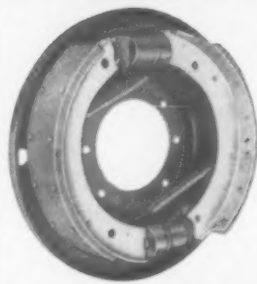


Downstairs looking up and upstairs looking down the easy staircase; extreme right, spacious "office" with the simplest of controls just where they should be

can be put to the test in service. Another advantage of the underfloor engine is that full use can be made of the available floor area and a total of 80 seated passengers can be accommodated. In the prototype, seating capacity has been limited to 78 to enable an easy, nearly straight, staircase to be used and to provide additional luggage space.

torque at 1,000 r.p.m. It is mounted under the floor on the left-hand side about midway between the axles, with the cylinder heads towards the centre. Transmission is through an automatic fluid-friction clutch and oil-operated four-speed epicyclic gearbox with electric semi-automatic (Continued on page 46)

GIRLING



BRAKING SYSTEMS

It's significant that the majority of British Commercial Vehicles are fitted with Girling Braking systems — significant but not surprising, because Girling have all the experience of 30 years, all the knowledge of an unremitting programme of research and development, and all the resources of the largest organisation of its kind in Europe to ensure that they do indeed make the Best Brakes in the World.

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TOURING BY EIGHT-SEATER

Commer 3-Tonner Performs Well

ON show for the first time at Earls Court this year on the Commer stand are goods and passenger vehicles from the versatile 3-ton range, which the company introduced early this year. This short report of the performance of an eight-seat dual-purpose vehicle, one of the standard vehicles in the range, on a 1,200-mile European tour, is therefore of topical interest, an interest that is perhaps sharpened by the increasing popularity of this type of vehicle for extended touring with small parties. The vehicle was put at our disposal by Commer Cars, Limited, as personal transport for our annual visit to the Geneva Motor Show in March. One of three passenger versions in the range the eight-seater has fully upholstered seats, the rear ones folding flush with the floor to provide useful goods capacity when required, while an upholstered 12-seater conforms to Ministry of Transport p.s.v. requirements and a 14-seater has slatted seats and is suitable for works transport.

City air ferry across the Channel. This operator's general height limit is 6 ft. 6 in. with exceptional facilities only at Ferryfield and Le Touquet for handling vehicles up to 6 ft. 8 in. high. The overall unladen height of the Commer on passenger tyres and with roof ventilator is 6 ft. 9½ in.

However, inquiry of the Channel Air Bridge service of British United Airways indicated a less restrictive height limit, vehicles up to 6 ft. 10 in. having been handled occasionally, and we accordingly booked return passage on this operator's Southend-Calais service with a fair amount of confidence, albeit prepared if necessary to lose height by reducing tyre pressures, or removing the 1-in. proud roof ventilator mounting. In the event, no special precaution was necessary, the vehicle going in and out of the aircraft smoothly, the loader at the Calais end on the return flight showing a particularly gay abandon, despite (or perhaps because of) our warning, in hustling the vehicle up the ramp

of stops for coffee and at the frontier and the Jura crossing.

Crossing the Jura range exposed one of the weaknesses of the forward-control set-back-front-axle layout for this class of vehicle, with its comparatively low rear-axle loading, when complete loss of traction was experienced approaching the summit of Col de St. Cergue, where snow compacted by the plough was still solid on the road. Progressive downward changes on the 1 in 10 slope, with only the smallest amount of throttle (it was much too long a pull for rush tactics) and the major part of the live load, including a casual passenger being given a lift from the Swiss frontier post to Nyon, in the back seat, failed to keep the vehicle moving and it came to rest with an idling engine still winding the rear wheels within 100 yards of the crest. However, a light push by two of the passengers got us rolling again and the climb was completed without further incident.

Actually, the conditions at this point were just about as bad as could be, short of deep drifts. The compacted snow had a hard glazed crust on the point of thawing on which it was difficult even to stand up. Other steeper slopes with snow into which the tyre treads could penetrate were negotiated quite successfully, but our experience indicated that the advice to carry snow chains on Continental touring at certain times of the year is

three days between our hotel in Nyon and the exhibition hall in Geneva provided an opportunity for appreciation of its light handling and lively performance in the unladen condition, while the advantages of the forward-control layout in modern congested urban conditions showed up in manoeuvrability and ease of parking in a 200 cu. ft. vehicle better than in the average private car of medium size. Minor troubles with instruments on



Despite its near approach to loading height limit, the Commer was taken unhesitatingly in and out of British United Airways' Channel Air Bridge Bristol Freighters



Fortuitous meeting with a barge on the Somme Canal at the lift bridge at Brie, through a missed turning in Péronne; right, turning on to Quay des Bergues from Rue du Mont Blanc, Geneva

The Commer 3-ton range, which we described in our issue dated January 9, is based on a compact and sturdy integral welded-steel chassis-platform incorporating running units already well proved in other Rootes Group vehicles. The 1½-litre overhead-valve petrol engine, which develops a maximum of 52 h.p. at 4,500 r.p.m., and four-speed synchromesh gearbox provide a lively fully laden performance and reasonably high top speed on unrestricted roads, while well-designed suspension, independent at the front, provides comfortable riding and excellent stability. The Perkins Four 99 1.6-litre diesel engine is available as a factory fitted option to provide maximum fuel economy with little if any sacrifice of maximum performance.

Crossing the Channel

Perhaps because of the necessity to provide good load space in the van versions (there is 200 cu. ft. capacity behind the front seats) and regulation headroom in the passenger versions, the overall height of the eight-seater on 6.50/6.70-15 tyres and with roof ventilator prevented use of the Silver

and through what must have been a fraction of an inch clearance under the main spar. Otherwise compact dimensions of the Commer, particularly overall length of only 14 ft., qualified for the very moderate fare of £16 return at winter rates, operated until March 31, and would make for equal economy by surface transport.

Chains Advised

The load for our journey was driver and three passengers, with luggage for a week, totalling about half a ton, increased occasionally by the odd extra passenger. Having cleared Customs at Calais just before midday, without unduly pressing the vehicle and taking time out twice for picnic meals, Troyes was reached by way of St. Omer Lilliers, Arras, Péronne and Soissons at 7.30 p.m.—a distance of about 250 miles covered at an average speed (running time) of 40 m.p.h. for a petrol consumption of roundly 23 m.p.g. Equally comfortable driving on the following day, on which there was heavy rain during the first two hours, disposed of the remaining 210 miles in under six hours, inclusive



Last of the winter snow was found in St. Cergue and it was still deep on the road over the pass



sound. Another weakness of some modern vehicles (though not particular to the Commer) came to light on the descent of the warmer slope of the pass, where snow had already thawed to two inches or so of wet slush over several miles of hairpin bends. Thrown-up slush compacted in the steering-link and suspension clearances, making both steering and front suspension extremely hard and providing justification of the practice of some Continental manufacturers of providing under-chassis fairings to prevent this trouble.

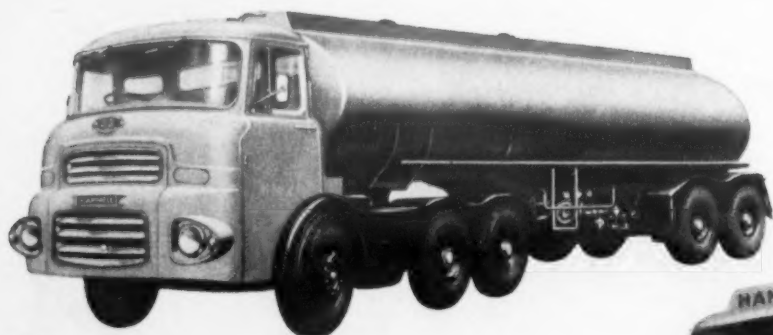
Use of the Commer as personal transport for

the way out also gave an opportunity of testing Rootes service in Switzerland. Both the fuel gauge and oil-pressure warning light had ceased to function at different points of the journey, but a short session with the Rootes Geneva agent, Tschudin S.A., was sufficient to have both defects rectified.

The return trip was made in three stages, namely a leisurely run from Geneva to Basel, with a three-hour stop at Berne, a whole-day stage of nearly 300 miles from Basel to Soissons and a high-speed run from Soissons to Calais between breakfast and

(Continued on page 34)

2 entirely NEW additions to the SCAMMELL range

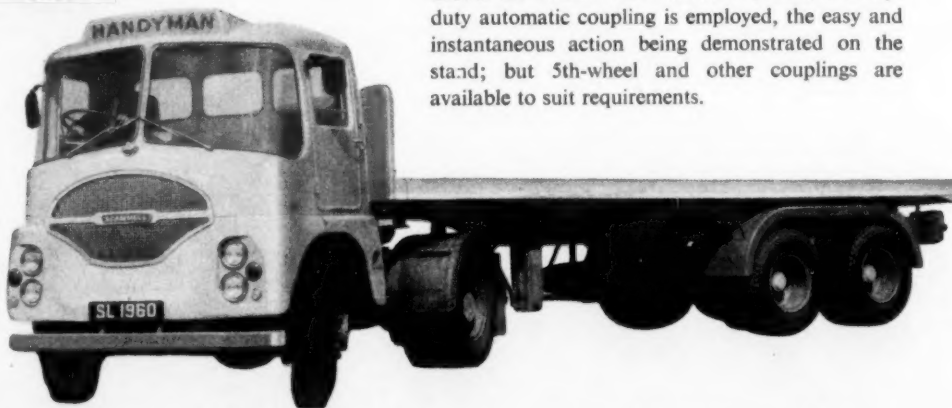


The TRUNKER,

a matched articulated 10-wheeler, is designed for modern operational needs and the motor-roads of the future. While legally limited to 24-tons g.v.w. in this country, it is easily adaptable for weights up to 30-tons where circumstances permit. The motive unit incorporates the following features: Low-mounted engine behind cab. Forward-entry cab with clear access from side to side. . . minimum engine noise and light progressive controls reduce driver-fatigue and provide maximum comfort. Driving bogie with high proportion of vehicle weight on driven wheels ensures good traction and directional stability. 10-wheel layout with non-reactive bogies gives powerful and progressive braking. Elimination of all pressure lubricated points with exception of propeller shafts and king pins reduces maintenance. 4,000 gal. fuel oil tank semi-trailer is mounted on new Scammell air suspension bogie specially designed to give high degree of stability.

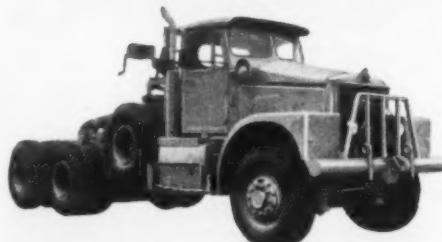
Pioneers of the articulated vehicle, with nearly forty years' experience, Scammells produce semi-trailers for transporting general merchandise; liquids; powders, etc., for payloads from 3 to 17 tons, with fully automatic or 5th wheel couplings, and up to 27 feet clear deck length. Also low loaders for abnormal and indivisible loads up to 30-tons.

The HANDYMAN

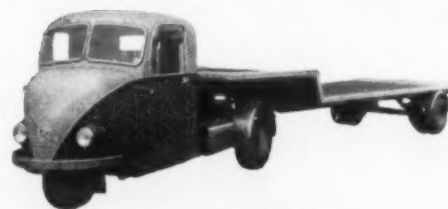


A new departure for Scammells, this 24-ton g.v.w. forward control articulated 8-wheeler is an addition to the present Highwayman range. It is designed to cater for the general haulage contractor and other users requiring maximum length semi-trailers. The all-welded semi-trailer frame, combining lightness with strength, is mounted on a new rubber suspension bogie. Alternatively, air suspension version shown on Trunker is available. Scammell heavy-duty automatic coupling is employed, the easy and instantaneous action being demonstrated on the stand; but 5th-wheel and other couplings are available to suit requirements.

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DODGE RANGE EXTENSION

Capacities Up To 9 Tons

NEW DIESEL ENGINES AND A FOUR-BY-FOUR

MANY changes in the Dodge forward-control goods vehicle range, including the introduction of entirely new 8- and 9-ton chassis for up to 14 tons gross weight and a new 354-cu. in. direct-injection diesel engine, as well as restyled front ends on both normal- and forward-control cabs, are announced by Dodge Brothers (Britain), Limited, for introduction at Earls Court this week. The Dodge range now embraces normal-control vehicles from 3 to 7 tons, forward-control

in the established 7-ton capacity chassis and 10- and 12-ton tractors, while the new single-speed or two-speed axles are also available on the 7-ton chassis and 10-ton tractor. The two-speed axles, which are standard on 9-ton vehicles and 12-ton tractors, also have larger crownwheels and pinions than hitherto.

All forward-control vehicles incorporate new front-end styling. The earlier triple grille with mesh facing is replaced by two broad-spaced grilles fronted by wide chromium-plated bars. The company's ram's head emblem is placed centrally between the two grilles, with the Dodge nameplate, now in larger letters, above them. Apart from this change, the current 5-ton chassis remain as before, but the 7-tonner now has a gross weight rating of 23,000 lb. and a high-tensile steel frame. Rear helper springs are now standard equipment, as are the five-speed gearbox and 8.25-20 12-ply tyres.

Normal-Control Range

Front-end restyling and the dropping of petrol-engined vehicles and articulated tractors from the range are the main alterations in the Dodge normal-control programme for 1961. No other changes were considered necessary in view of the popularity of the range, particularly overseas. The 3-tonner now has more power, the former 189-cu. in. diesel engine having been replaced by a new 203-cu. in. four-cylinder unit. Similarly, 7-ton



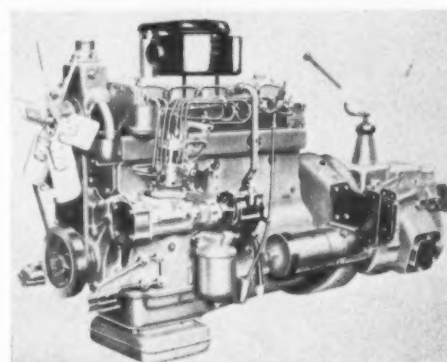
New front-end styling of Dodge bonneted range covers a new 203-cu. in. diesel engine in the 3-tonner and a new direct-injection 354-cu. in. engine in the 7-ton class

vehicles from 5 to 9 tons and tractors for 10- and 12-ton semi-trailer loads. In addition, the company has introduced a 5-ton normal-control diesel-powered 4-by-4 chassis for a gross weight of 21,000 lb., irrespective of operating conditions, and a long-wheelbase forward-control six-wheel chassis, which has been produced in collaboration with York Trailer Co., Limited, for a gross weight of 36,000 lb. The company also announces that petrol engines will no longer be offered in any of its vehicles and the dropping of the normal-control articulated tractor from its range.

14-ton Gross Chassis

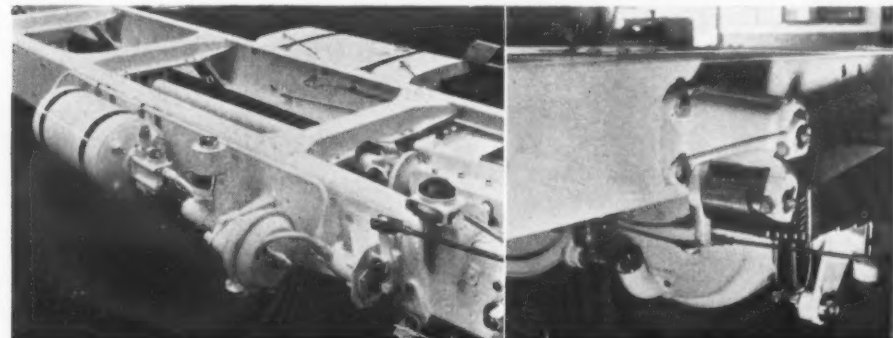
The new 14-ton gross chassis has a nominal payload rating of 9 tons and is available in three wheelbase lengths of 9 ft. 8½ in. for a 7-cu. yd. tipping body, 13 ft. 7 in. and 17 ft. 9 in., the longest providing for a maximum legal body length of 24 ft. 11 in. It is powered by the Leyland O375 direct-injection diesel engine, introduced by Dodge into its 7-ton capacity class last year, which is set to produce 110 b.h.p. at 2,400 r.p.m. It drives through a hydraulically operated 14-in. single dry-plate clutch and five-speed constant-mesh gearbox to an Eaton two-speed axle of 20,165-lb. capacity, with electric gearchange. Front axle capacity is 11,200 lb. Air servo hydraulic brakes have 15½ in. by 4½ in. front and 15½ by 7 in. rear two-leading-shoe drum equipment, with moulded brake linings providing a total area of 680 sq. in.

The standard 10 in. by 3 in. by ¾ in. chassis frame is given added strength on the 17 ft. 9 in. wheelbase version by the inclusion of ¾ in. thick L-section flitch plates with a total depth of 11½ in. Dual-rate springs with wrapped eyes have hanger brackets bolted to the chassis frame. The 16-leaf front springs are 50 in. by 3 in. and have a total



The new direct-injection 354-cu. in. diesel develops 112 b.h.p. at 2,800 r.p.m. It has the C.A.V. DPA fuel-injection pump

chassis are now offered with the new Six 354 engine in addition to the currently-used 351-cu. in. unit. At the front end, heavy chromium-plated horizontal bars replace the mesh on the two grille apertures. The Dodge name, in larger letters, has been moved from the top of the bonnet to a posi-



Air servo-hydraulic brake equipment layout and, right, robust rear suspension embodying 14-leaf 54 in. by 3½ in. springs of the new Dodge chassis for 14 tons gross weight

thickness of 5⅜ in. Those at the rear are 48 in. by 3½ in., with 13 leaves, on the short-wheelbase chassis, and 54 in. by 3½ in., with 14 leaves, on long-wheelbase versions. Cam-and-double-roller steering gear has a ratio of 28.5 to 1 and power assistance is optional. Three-piece 10-stud wheels are equipped with 10.00-20 14-ply tyres.

tion in between the two grilles and the Dodge ram's head insignia is now incorporated in a medallion extending along the top of the bonnet.

The new four-wheel-drive Dodge is based on the normal production 7-ton chassis and incorporates a two-speed transfer box and Tracta constant-velocity universal joints in the front axle. The



Typical of the new forward-control range, which extends to 14 tons gross weight solo, is this 8-tonner

The new 8-ton capacity vehicle has a generally similar specification for a maximum gross weight of 27,000 lb. It can be powered by any one of three diesel engines—Perkins 351-cu. in. (R6) or 354-cu. in. (Six 354) or Leyland O375 and can be fitted with a new heavy-duty spiral-bevel axle, with a capacity of 19,250 lb., in place of the two-speed unit. Similar engine options are available

basic components of the 8-ton chassis have been used for the new three-axle chassis, with such mandatory fittings as air servo-hydraulic brakes, variable-ratio handbrake and two-speed rear axle. This approved conversion, with a gross weight rating of 35,500 lb., has been designed primarily for tipper work and can be fitted with any one of the three six-cylinder diesel engines.



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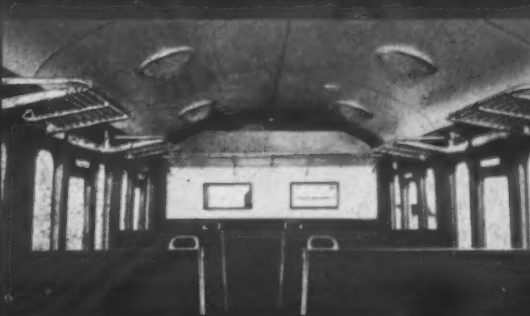
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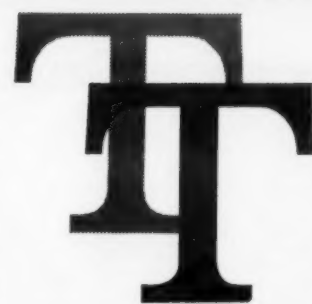
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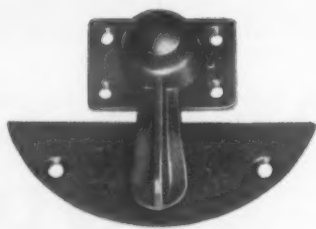
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DIESELS

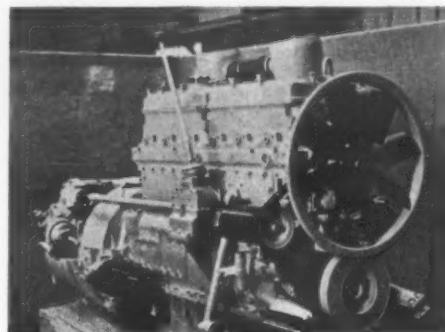
As we recorded in our issue dated September 10, the new range of Power-Plus diesel engines introduced by Leyland Motors, Limited, comprises units of 399 cu. in. (6.54 litres), 597 cu. in. (9.8 litres) and 677 cu. in. (11.1 litres), designated O400S, O600 and O680 respectively. All are direct-injection six-cylinder water-cooled units featuring exceptional power output and fuel economy, which have been achieved by a redesign of engine breathing passages and a new patented type of toroidal combustion chamber—named Spheroidal by Leyland—that results in improved combustion characteristics.

Apart from these changes, the Power-Plus O600 and O680 engine closely follow the pattern and general specification of their earlier counterparts, which have proved so successful in most parts of the world. These two engines are designed as alternative power units for the new Leyland heavy-duty goods vehicles in the 14 to 24 tons gross weight range, but will also be used in other Leyland Group goods and passenger vehicles. The smaller unit is intended as the standard engine in the new range, offering exceptional fuel economy and long life between overhauls, with the larger engine as a more-powerful alternative for very high-speed trunk operation.

Economy Engine

The O600 engine has bore and stroke measurements of 4.8 in. (121.9 mm.) and 5.5 in. (139.7 mm.), giving a capacity of 597 cu. in. (9.8 litres). With a compression ratio of 15.8 to 1, it is set to develop a net installed output of 140 b.h.p. at 1,700 r.p.m. and 438 lb./ft. torque at 1,200

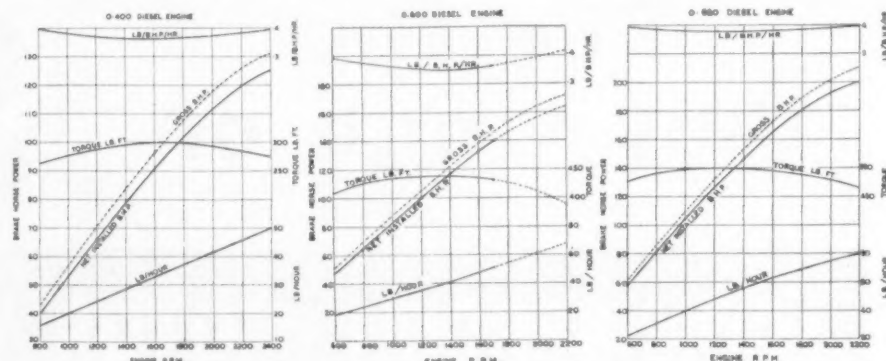
giving a capacity of 399 cu. in. (6.54 litres), and a compression ratio of 16 to 1, it develops a net power of 125 b.h.p. at 2,400 r.p.m. and net maximum torque of 300 lb./ft. at 1,600 r.p.m. Weight of the engine, with dynamo and starter, is 1,181 lb. This engine too has renewable dry-



Power-Plus O680 engine showing the fan ring, which seals on to a radiator cowl

type porous chrome-plated cylinder liners, but in this case of steel to provide a thinner liner than cast iron.

Various changes from the O375 specification include improved cylinder-head fixing by means of a ring of six studs around each cylinder bore



Performance curves of the three new engines under standard conditions

r.p.m. Weight of the engine, with dynamo and starter fitted, is 1,808 lb. Features of the engine are dry-type cast-iron cylinder liners designed for easy renewal, renewable Valmet valve seats, nitrided chrome molybdenum crankshaft, thin-shell renewable crankshaft bearings, gear-driven auxiliaries and extremely efficient filtration of fuel, lubricating oil and intake air. The C.A.V. in-line fuel-injection pump, used in conjunction with

and increased crankshaft bearing dimensions. Fuel-injection equipment includes an in-line Simms Minipump with mechanical governor and Leyland four-spray injectors.

TOURING BY EIGHT-SEATER

(Continued from page 30)

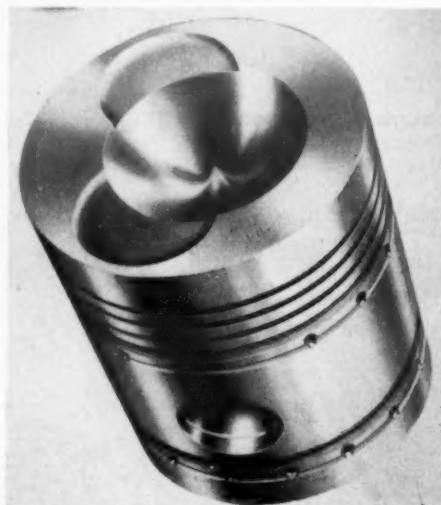
lunch in time for a 2.30 p.m. flight back to Southend. The 150-mile final stage, less than half of which perhaps is really good fast motoring road, was covered comfortably in 3½ hr. at an average speed of 43 m.p.h.

From the driver's point of view the whole run, which totalled 1,200 miles on the Continent and 1,434 miles overall, proved entirely pleasurable and strain-free. Stability of this class and configuration of vehicle, particularly when empty or lightly loaded, is not always exemplary, but the Commer proved to be free of the usual faults. Only one comment arises in this direction, a tendency for the tyres to squeal noisily on some types of road surface under only moderate cornering forces when stability and roadholding were not in any way in question, a characteristic incidentally which had not been apparent in either of the 4-ton vans we tested in this country. Apart from the gauge and warning light already mentioned, the vehicle functioned perfectly mechanically.

Satisfied Passengers

Comment from passengers was almost entirely favourable, points mentioned specifically including comfortable upholstery and shape of seats, excellent visibility much superior to that obtained from a private car, easy entry and exit through the side door with automatically retracting step (though the weight of the step made the door less easy to close from the inside without a consciously firm pull) and good ventilation during the sunny and warmer parts of the journey. Adverse comment related to a draught from the side door affecting the lower limbs of rear-seat passengers during colder spells (though general interior temperature could be kept comfortable with use of the efficient heater) and lack of a handgrip for the inside intermediate passenger, need of which was occasionally felt in fast corners.

Good luggage space exists behind the rear seat, with access through the normal back doors, and a roof rack is available as an optional extra (though this would put the vehicle well outside the air ferry loading limit, even empty). Folding the seats away is a simple and quick operation; with the rear seat only out of commission there remains comfortable seating for five including the driver and there is over 100 cu. ft. of load space. Overall fuel consumption for the 1,400-odd miles worked out at 24.7 m.p.g. of standard-grade petrol, with the mainly higher-speed Continental running coming out at about 23 m.p.g. Only 1 litre (less than a quart) of oil was added to the sump. At about £1,000 fully equipped for touring, inclusive of United Kingdom purchase tax, the Commer 4-ton station wagon or estate car is in our view a fast, comfortable and economical vehicle well suited to small-party touring.



A Power-Plus piston showing the new Leyland Spheroidal combustion chamber in the crown

Leyland four-hole injectors, incorporates a mechanical governor giving close control from 400 r.p.m. idling to 1,700 r.p.m.

The O680 engine has a bore of 5 in. (127 mm.) and a stroke of 5.75 in. (146 mm.), giving a capacity of 677 cu. in. (11.1 litres). With 15.8 to 1 compression ratio, it has a net installed output of 200 b.h.p. at 2,200 r.p.m. and 548 lb./ft. at 1,200 r.p.m. Principal differences, apart from power output, are in cylinder liners and governing. Cylinder liners are still of the prefinished easily renewable dry type, but they are porous chrome plated, of Laystall Engineering manufacture, which provides exceptionally hard-wearing bores. In this case, the C.A.V. fuel pump is fitted with a hydraulic governor, which gives stable idling at about 350 r.p.m. and close control up to the maximum speed of 2,200 r.p.m. A feature of both engines is an electrical float-type oil-level unit in the sump, which permits use of a remote instant-reading indicator operated by pushbutton in the cab, as well as a conventional dipstick.

Steel Cylinder Liners

The Power-Plus O400S is a development of the Leyland O375 engine for use in a higher-performance Super Comet goods vehicle range and certain Albion chassis. With a bore of 4.22 in. (107.19 mm.) and stroke of 4.75 in. (120.65 mm.),

THE DEVELOPMENT OF THE TROLLEYBUS

3—Leeds and Bradford Make a Start*

AS has been noted in the previous article, 1909 and 1910 were years when many British town councils and a few company directors were planning great schemes for the operation of trackless trolleys. A great many of these plans were to be frustrated by the necessity to promote a special Bill in Parliament for powers to erect the poles and overhead equipment. No one government department had the power to sanction such procedure and the cost of promoting a Bill would often exceed the cost of the actual installation.

After a false start in 1908 when the ratepayers would not consent to the scheme, Bradford obtained powers in 1910 to operate trackless trolleys on one route in that city. Meanwhile in 1909 Leeds Corporation had sent a deputation to Vienna to see the system operating there and in 1910 also obtained the necessary Parliamentary powers to operate 4½ miles of trackless trolley route. Another deputation was sent by Sheffield Town Council to Vienna in 1909 and this party also visited Mulhausen in Germany. But it was not until three years later, in 1912, that Sheffield obtained powers to operate trackless trolleys and even then they were allowed to lapse.

Bradford Confidence

Bradford appears to have been more confident in this new mode of transport than Leeds, for it was 1910 before it sent a deputation to visit Continental systems, by which time a Bill was proceeding through Parliament. The Bradford party visited Italy, Austria and Germany, inspecting both tramway and trackless systems. The two cities, Leeds and Bradford, proceeded



Grandfather of the British trolleybus—the Railless demonstrated at Colindale in Metropolitan Electric Tramways livery in 1909. Note the twin trolley head. The route was not seriously promoted as a trolley vehicle line

neck and neck with their plans during the latter months of 1910, and early in 1911 they agreed to commence operations on the same day.

Accordingly on Tuesday, June 20, 1911, the first trackless trolley routes for public service in this country were opened at noon, simultaneously in Leeds and Bradford. In Leeds the Lord Mayor, wearing his chain of office, and an Alderman, each drove a car, but in Bradford the Lord Mayor contented himself with a token operation of the controller. The Leeds route was from City Square to Upper Moor Top, Farnley, a distance of 3½ miles. The route had been authorised as far as Drighlington, but the extension was not proceeded with until 1921. The Bradford route was from Laisterdyke, Stickler Lane to Dudley, Wakefield Road—a distance of 1½ miles.

First Vehicles

Both cities had similar single-deck vehicles built by Railless Electric Traction, Limited, at a cost of £700 each. They were powered by two 20-h.p. Siemens motors through worm gearing to a countershaft and thence by a sprocket and chain to the rear wheels. The bodies were by Hurst, Nelson and seated 28 passengers on rattan spring seats arranged transversely. The four Leeds cars were front-entrance vehicles and for the first four months were operated by one man, but later a conductor was provided. The two Bradford cars were rear entrance and were always manned by a driver and conductor.

Both routes operated about every half hour, with a more frequent service on Saturdays and Sundays. The costs of installation were £1,734 per mile in Leeds and £1,246 per mile for the route in Bradford. Both services were an instant success and for the next few years became the centre of attraction for many deputations from interested bodies who were now saved the necessity of a visit to the Continent to see trackless trolleys.

Trolleybus Mania

The 1911 Parliamentary Session saw the promotion of no fewer than 15 private Bills by various authorities and companies for powers to run trackless trolleys. The most interesting of these from the historical point of view was the one known as the Brighton, Hove and District Railless Traction Bill, to authorise the Brighton, Hove and Preston United Omnibus Company to run a trackless trolley system between Brighton and Rottingdean. This was the first rumbling of a big storm which broke in 1912 over trackless trolleys in Brighton and which was not settled for many years. By January, 1912, three Bills had been promoted: by the company, by Brighton Corporation and by Hove Corporation. Each really wished to prevent the other from obtaining a monopoly of services in the two towns.

A fourth Bill promoted in 1911 by Brighton and District Tramways (on behalf of the B.E.T. horse line from Brighton to Shoreham) was buried in the course of the battle and would only have stood if the other three had been withdrawn. Both Brighton and Hove Corporations were obliged to hold polls in order to proceed with their Bills and in both cases a majority was in favour of supporting such action. By October, 1912, the company wisely decided to drop out of the affair in consideration of £12,000 from Brighton Corporation for the powers obtained under the Company's Act of 1911. In 1913 Brighton Corporation applied for a further Bill to take over these powers, leaving Hove Corporation time to renew their plans of opposition. At this point certain sections of Hove Council began to waver and put forward the opinion that Thomas Tilling, Limited, could run a very good service of petrol-electric omnibuses. But after going to the expense of obtaining the Bill there was a majority opinion that it should be put to use and so the battle continued through 1914. Finally, although the

difference of opinion was reduced to a preference for the Cedes-Stoll system in the case of Hove and the R.E.T. system in the case of Brighton, it was nevertheless so strong that the case was put before the Board of Trade for arbitration. The war diverted the high feeling on the subject and by April, 1915, Hove granted Thomas Tilling licences to operate petrol-electric buses in that town although Brighton refused to do likewise and, indeed, applied for an extension of trackless trolley powers a year later.

In 1912

This story, but briefly summarised here, has taken us on far ahead of 1911. In March, 1912, Mr. Buxton, then President of the Board of Trade, recorded that during the years 1909-1911, 24 Bills and Orders were promoted for trackless trolley systems, while a further 12 were under way for 1912. Of the successful ones it is interesting to note those of Chiswick Urban District Council in 1911 and Sheffield Corporation in 1912, neither of which systems were ever constructed. The first

trolley vehicle mania confined itself largely to paper projects.

On Thursday, September 5, 1912, the third system in the United Kingdom was opened at Dundee after an inspection by an official of the Board of Trade two days previously. The route ran from Maryfield to Fairmuir via Clepington Road, a distance of 1½ miles. Two Railless Electric Traction cars were used, each seating 28 passengers in bodies built by Milnes Voss. Two 20-h.p. motors were fitted. The service was operated under

the act of 1907 mentioned above and owing to changes in plan regarding the route, had been much delayed in starting. Unfortunately the operation was not of very long duration. By April, 1914, it was discovered that the surface of Clepington Road was very badly cut up and first-aid repairs would be likely to cost £6,000. This was out of the question when the system had cost less than £3,000 to install; furthermore car receipts at 2½d. per mile compared unfavourably with tramcar receipts of up to 11d. per mile. Consequently the service ceased during the summer of 1914 and the cars were stored pending improvement of the roads at some future date. The war made this possibility even more remote and the vehicles were eventually disposed of.

Rotherham

Another system, that at Rotherham, begun in the same year, was to have a much longer life. The line was opened on Thursday, October 3, 1912, under an Act of 1911. The opening was attended with the usual civic ceremonies including a luncheon at the Town Hall. Three R.E.T. cars were employed at the start, each seating 28 passengers in two compartments. Each car weighed 3 tons 12 cwt. unladen and was powered by two 20-h.p. Siemens motors and was supplied at a cost of £725. A half-hourly service was provided between the Stag Inn, Rotherham and Maltby, a distance of 4½ miles. Rotherham upheld its faith in the trolleybus and the system expanded considerably during the period between the wars, although the Maltby route is now maintained by diesel buses. Meanwhile in Paris a regular service based on the Cedes-Stoll system had been operating in the St. Mandé district since the autumn of 1912. Four cars each seating 24 passengers were in use over a two-mile route.

It is interesting at this point to quote the opinion of a speaker at the Tramway and Light Railway Association conference in the summer of 1912. He thought "... railless traction can best provide travelling facilities beyond a tramway terminus provided the road surface is good and traffic justifies a 15-min. service. This method of traction can be provided at low capital cost and is a suitable means for building up traffic of a road which in time may justify conversion to a tramway. In agricultural districts it is suitable for the transport of passengers and produce although in the latter case the running of trailers would probably be necessary for economic working." The first part of the extract sums up the current feeling in 1912 towards trackless trolleys and it was clearly held by many that the systems were only an interim step leading to a tramway at a later date. The agricultural uses suggested were probably culled from Continental practice although they held little attraction in this country and the Acts relating to Rotherham, and later to Chesterfield, specifically forbade the use of trailers.

(To be continued)

Trimproof Fabrics, Limited, Trim, Ireland, which manufactures p.v.c. leathercloth, announces that because of an increase in its business with the British motor industry, it has appointed Leeway Engineering, Limited, Morley House, 320 Regent Street, London, W.1 (telephone Langham 3894), representative for the United Kingdom. Future inquiries regarding Trimproof Fabrics should be made to Leeway Engineering.

Blue Peter Retreads, Limited, has acquired the registered trade mark "Red Seal" from Repetition Tyre and Accessories, Limited, and has taken over the manufacture and marketing of Red Seal retreads. Mr. W. H. Stevenson, for many years a director of Repetition Tyre and Accessories, has joined Blue Peter Retreads as general sales manager for Red Seal retread tyres, which are being marketed independently.

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* Previous portion appeared May 14, 1960.

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JONES BROS. CENTENARY IN FEBRUARY

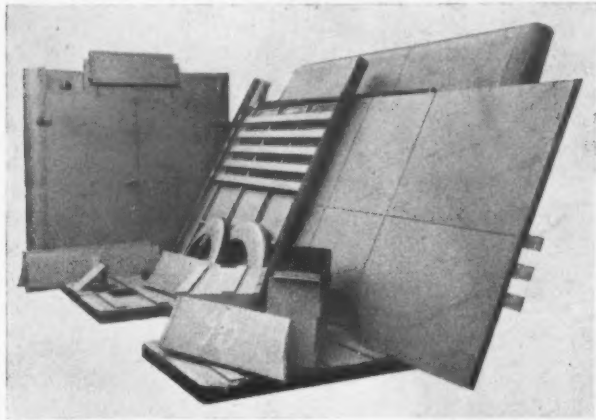
ALTHOUGH the craft of coachbuilding as applied to commercial vehicles, apart from lighter delivery vans, has not given way to the mass-produced metal shell in the same degree as in the private car industry, much use is made today of assembly of bodywork from standard components turned out in quantity by the metal producers, finished as quickly as possible with one of the modern synthetic coatings. Ringing the changes with these standard components, with the occasional introduction of a few individually produced

Lonsdale window, screens and other vehicle furnishings. Another company formed initially by Jones Bros. in 1933 was Latex Upholstery, Limited, which was established to market seats and latex rubber seat cushions developed in association with Dunlop Rubber Company.

Goods Vehicles Again

Bodybuilding was discontinued during the war, when the company was engaged in the production of folding assault craft and jigs and fixtures for the aircraft industry, but was restarted immediately afterwards. With all types of vehicles in short supply, much of the early post-war work was building station wagon and pick-up bodies for various oil companies on big car chassis, which were rather easier to obtain than light goods chassis. These were produced in fair quantities, so much so in fact that a move to the larger premises now occupied in Old Oak Common Lane was decided on in 1949. There space existed for expansions into the wide field of goods-vehicle bodybuilding now undertaken by the company.

Jones Bros. production is extremely varied, as are the materials used and methods of construction, though some of the production runs of particular classes of vehicle are quite substantial. One of the standard types is an all-metal van body, of which 60 are now under construction on 2-ton Bedford chassis for various oil companies. This employs a welded framework of steel extrusions with riveted steel exterior panels, aluminium front canopy and interior panelling to waist level. A similar form of steel-framed steel-panelled construction is being



Components of a prefabricated van for 2-ton Ford chassis produced in quantity for export

reinforced-plastics mouldings, can often go a long way towards meeting individual customer's requirements and it must be admitted that modern methods produce serviceable and presentable results at remarkably low cost.

But it is also true that it is becoming increasingly difficult to find the coachbuilder willing or able to cater for specific needs that cannot adequately be met "off the peg," or prepared to allow the customer to exercise a choice of materials and standard of finish. One such concern still flourishing in north-west London, Jones Bros. (Coachbuilders), Limited, Old Oak Common Lane, not only deals almost exclusively in bespoke commercial vehicle bodybuilding but has the added distinction of having practised the craft continuously over a period only a month or two short of a century.

Family Business For 90 Years

The Jones concern was founded in Notting Hill in February, 1861, and was operated as a family business for 90 years, there having been a Jones actively engaged until 1950. Early work was the construction of horsedrawn vehicles of all types, with tradesmen's carts a speciality, until about the turn of the century, when in common with many other coachbuilders of the day, the Jones establishment turned its attention to the equipage of motor vehicles. The switch brought a change of emphasis and new and expanding business tended to move away from commercial vehicles as the company established an enviable reputation in the field of custom-built bodies for high-quality motor cars, including de Dion, Bugatti, Humber Pullman, Bentley and Rolls-Royce.

That reputation has persisted through half a century of change, which has practically eradicated the practice of ordering a car body separately from the chassis and liquidated the scores of individual concerns once in a similar line of business, through two major wars and despite changes within the company itself that have again, since 1946, brought a return of activity in commercial vehicle bodybuilding. Evidence of this lies in the facts that Jones Bros. was given the contract to build the cabriolet bodies for eight Humber cars ordered



Fire Armour equipment on Thames 15-cwt. for Federation of Malaya Fire Services

used for ambulance bodies under construction on Ford Trader chassis for Pakistan, these being fully panelled internally in aluminium over a Rocksil insulating layer.

A more traditional form of construction is seen in a batch of roller-shutter van bodies being built on Bedford 7-tonners for Empire Foods, which



Spacious fish-and-ship shop on Karrier Bantam and, right, bus body on Bedford 30-cwt. for Iranian Oil Company



for the Royal tour of Australia in 1953 and that the company now builds the bodies of Bristol and other quality cars.

Early Quantity Production

An early successful essay into quantity production of taxicab bodies was initiated by Alfred Jones, a grandson of the founder, in 1930. Hitherto largely individually built and finished by traditional methods, cab bodies were expensive and the demands of an expanding taxicab industry were threatening to outrun supplies. Into this breach Jones Bros. launched a low-price semi-mass-produced body for Austin chassis, for which the concession was obtained through the London distributor of Austin taxicabs, Mann and Overton, Limited. The cab was steel panelled on a timber frame and finished in cellulose. Peak output reached 25 a week and some 8,000 were built before production was stopped by the outbreak of war in 1939.

Design work on the cab disclosed the need for a cheap and efficient window-balance gear and, in the absence of anything considered suitable, Jones Bros. set about its own design and produced the Lonsdale balanced window, which not only equipped the new cab but also attracted the interest of other coachbuilders. This led to the formation of a subsidiary company, Lonsdale Products, set up for commercial exploitation of the

have Plymax panelling over a frame of seasoned ash assembled and gluing and screwing, and in all-timber bodies on Karrier Gamecock chassis for the Ministry of Aviation. Among the bigger vehicles now on the shop floor are a batch of light-alloy 15-cu.yd. tippers on A.E.C. Mammoth Major 8 chassis. These employ Southern Forge standard extruded sections and plate, bolted and riveted, a multi-sandwich floor formed of double tongued and grooved hardwood, faced and interleaved with NS4 aluminium-alloy plate, and Edbro-B. and E. tipping gear.

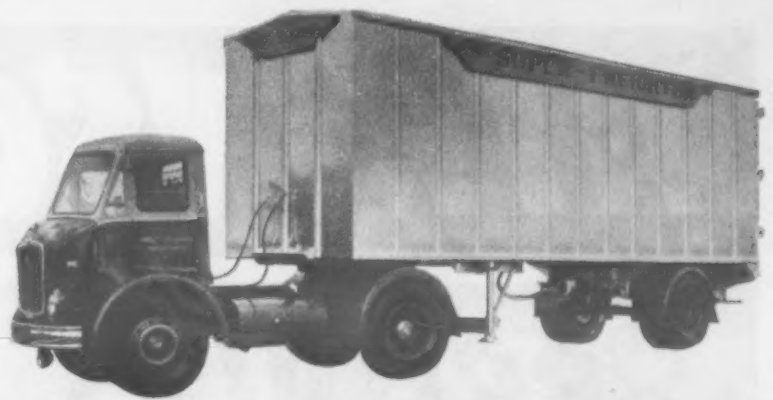
Containers

The company also undertakes production of transport containers of various types and in any material to order. In this field, an order for five transportable staff changing rooms, which has recently been completed for A.R.A.M.C.O., is of interest for illustrating Jones Bros. versatility. The rooms, or houses, are of heavy-duty construction to withstand the rigours of slinging and cross-country transport. Measuring 20 ft. by 8 ft., they have r.s.j. underframes and aluminium panelling on steel framing and are equipped with windows, ventilators, electric fittings and clothes lockers.

During a recent visit to the factory we were struck by the proportion of timber and timber-

(Continued on page 40)

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MATHEMATICAL VEHICLE DESIGN

The Case for a Technical Office

By a Special Correspondent

IT is widely recognised that aircraft engineering is more advanced technically than other comparable forms of design engineering. Some authorities have stated that the vehicle industry can be coupled with the shipbuilding industry as being the most backward of all the mechanical engineering groups, citing percentages of graduates employed as proof of this.

There are obvious reasons why the aircraft industry has had to sink large sums of money—often government money—into highly complicated technical investigations, and into design methods which are largely mathematical. The stage has now been reached when a successful aircraft, within the operating conditions already known, can be designed "off the board," with rarely need for major changes during development. These "designed in" qualities include handling, stability, performance, freedom from vibration and so on. This is not to say of course that new aircraft do not need testing to check these properties, or that new unknowns are not met with in aircraft development, but largely these are new unknowns and not the same problems having to be solved anew for each design.

Design By Experience

The prevailing method of design and development in the vehicle industry is one of designing on the basis of experience and of ironing out unpleasant characteristics during development. The success of our vehicles and the continued improvement pays great tribute to the ability of our engineers to operate the system satisfactorily. The question is, is it economic to continue to solve

* Horowitz, M. *Suspension of Internal Combustion Engines in Vehicles*. Proceedings of the Automobile Division of the Institution of Mechanical Engineers, 1957-8, pp. 17-21.
† Milliken, W. F., and Whitcomb, D. W.; Segal, L.; Close, W., and Massey, C. L.; Fonda, A. G. *Proceedings of the Automobile Division of the Institution of Mechanical Engineers*, 1956-7, pp. 287-425.

the same development problem for each new vehicle produced, or can the prototype development work be shortened by the use of more extensive mathematical processes in design. The answer to this may not necessarily be that mathematics pays, since the cost in time, money and even lives of full-scale development is vastly less in the case of vehicles than in the case of aircraft. In spite of this, greater refinement of design must also follow from a more technical approach and it is the writer's opinion that competition alone will eventually force the adoption of this method.

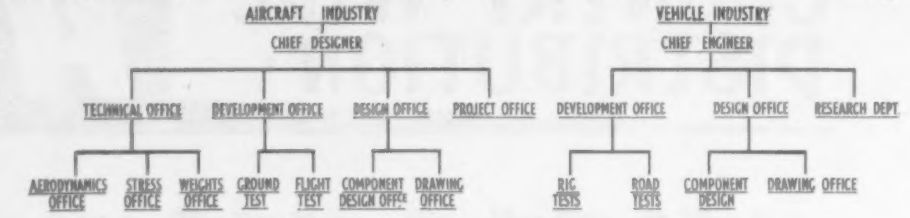
To get an idea of the changes that would be required in the vehicle industry, the typical method of the design organisations of the two industries is shown in the accompanying illustration. The difference in the two methods of design is obvious from the charts, as there is no real place in the vehicle design team for a technical office, where a group of technicians can sit down and do sums.

Mathematical Design

What would be the effect of a technical office on the existing engineering groups of the vehicle industry? Design engineers would have more precise knowledge on which to base designs; similarly, draughtsmen would be given more accurate loadings for the components they are working on. Development engineers would continue to ensure that the vehicle when designed was fit for production, but also this work would be directed towards providing data by which subsequent designs could be produced with less development time in the hardware stage. This would reduce the role of "cut and try" in vehicle development and replace it by systematic measurement. The technical office and development office together would tackle urgent development problems, such as handling, vibration and noise, both theoretically and practically.

The research section, which at present is concerned with problems associated with current vehicles, could live up to its name by having the time and facilities to investigate general problems connected with vehicles in a fundamental manner. The results of this research are likely to be expressed in mathematical form and would require an organisation similar to the proposed technical office to incorporate them into future designs.

So far, we have indicated the need for the addition of a technical office to the present design organisation of the vehicle industry and suggested how it could fit into the work. To make the story



Typical design organisations in the aircraft and motor industries

more practical, it is necessary to indicate some of the design problems that would be tackled during the initial stages of such an office.

Vibration phenomena are ever present in vehicle development and could well be the starting point for a technical office. These problems—chassis vibrations, cab shake, engine mountings, clutch judder and so on, are all related but at present are dealt with piecemeal, sometimes by rule of thumb and when this fails by more technical methods. Little attempt however is made to remove the vibration at the design stage. It is true that the basic theoretical work has been done on nearly all these problems either by vehicle manufacturers themselves or by the suppliers of such items as engine mountings* or by research organisations such as the Motor Industry Research Association at Lindley.

The design engineer can only use the generalised results of this work as a guide since there are no facilities for a thorough analysis to be made in each case. How many vehicles, for instance, are built and sold without the natural frequencies of the transmission system being calculated so that

all known exciting frequencies can be avoided?

Looking further ahead, the pioneering work being carried out at the Cornell Aircraft Laboratories on vehicle stability and handling problems opens up a whole new avenue of investigation, which is a direct parallel with the technical work carried out in the aircraft industry and which will demand a similar organisational solution. The preliminary reports from Cornell Aircraft Laboratories† show that it will be possible to design vehicles with any required handling characteristics when the characteristics of the tyres are known. Eventually tyres and vehicles can be developed

together to give qualities of ride and handling that we have not yet experienced.

The future outlook may best be summarised by quotations from one of the Cornell reports entitled *General Introduction to a Programme of Dynamic Research* by W. F. Milliken and D. W. Whitcomb. Having stated that "... it may be estimated that present knowledge of automobile handling is on a par with that available to the aircraft designer of the early 1920s ..." and that "... the ability to predict behaviour and call out desirable characteristics are yet to become a part of the practising automotive engineer's facility" they conclude "... should the automobile continue to be viewed as a group of proprietary assemblies, when, like nature, an infinite variety of form is possible if underlying principles, to which all should adhere, can become known?"

Other Factors

There are other factors demanding the setting up of technical offices in the vehicle industry; the availability of analogue computers, which make the solution of dynamic problems a rapid process; the fact that many vehicle manufacturers have installed digital computers for other operations and that these can be used to help in the more lengthy numerical design problems; and finally, the fact that both these aids and a more thoroughly mathematical approach are already being used by competitors, particularly on the Continent.

It need hardly be said that a technical office could develop into an expensive appendage to the main design team, unless the engineers at the highest level were convinced of the need for it and insisted that it played a full part in design work at all stages.

JONES BROS. CENTENARY

(Continued from page 37)

framed bodies under construction; we were told that it is still preferred material with many operators provided selection of materials and quality of workmanship can be relied on—a field of experience that is rapidly diminishing and in which Jones Bros. excels. The company is not a large one judged by modern standards but most of its 100 employees, some of whom have been with the firm for 30 years, are craftsmen exercising skills and a pride in workmanship that unfortunately are not so easy to find in these days of mass production.

Jones Bros. has a name for an unusually high quality and durability of finish only achieved by painstaking and tutored work with rubbing block and brush and a wide experience of materials used. A number of customers regularly contract with the company for the finishing of standard vehicles, while others have all their promotional vehicles built and finished by Jones Bros.; additionally, the panel shop at Old Oak Common Lane produces quantities of shaped panels in steel and light alloy for other coachbuilders. These facts are evidence enough that such skills are still highly valued in the industry and, it is to be hoped, an insurance against their eventual submergence in the modern ocean of machine minding.

PUBLICATIONS RECEIVED

CROFTS ULTIVEX ROPE DRIVES. An illustrated brochure issued by Crofts (Engineers), Limited, Thornbury, Bradford, 3, describing a new range of belt drives claimed to have advantages over conventional drives.

RESEARCH AT SUNBURY. An attractively produced brochure by the British Petroleum Co., Limited, Britannic House, London, E.C.2, describing and illustrating current work at the group's research centre at Sunbury.

TYRE BUYERS GUIDE. A comprehensive manual published by the Goodyear Tyre and Rubber Co. (Gt. Britain), Limited, giving specifications of the entire Goodyear tyre range. Service hints are included.

CAR HIRE THROUGHOUT GREAT BRITAIN. A new publication by the Automobile Association giving details of nearly 900 hire-car operators in 470 cities and towns in England, Scotland, Wales and the Isles of Man and Wight. Operators in London are not included. The booklet is available free to members.

COBURN SLIDING DOOR GEAR. A new catalogue issued by Coburn Engineers, Limited, Coburn Works, Peasmarsh, Guildford, Surrey, providing a comprehensive guide to the company's standard range of sliding door gear and fittings for a wide variety of applications.

ROSPA—WHAT IT IS—WHAT IT DOES. A new edition of a booklet describing the manifold activities of the Royal Society for the Prevention of Accidents (ROSPA), which for about 40 years has been in the forefront of accident prevention on the roads, in industry and in the home.

1959 STATISTICAL REVIEW OF THE WORLD OIL INDUSTRY. Facts and figures, generously supported by pictorial presentation, on all aspects and activities of the oil industry are given in this publication by the British Petroleum Co., Limited, Britannic House, Finsbury Circus, London, E.C.2.

EFCO HEAT TREATMENT FURNACES. A new publication by Electric Resistance Furnace Co., Limited, Netherby, Queens Road, Weybridge, Surrey, illustrating and describing a range of furnaces for heat-treatment processes developed by the company from experience gained in over half a century of design and manufacture in this field.

MAINTENANCE WELDING DATA BOOK. Published by Eutectic Welding Alloys Co., Limited, North Feltham Trading Estate, Feltham, Middx. Describes briefly the history of development of low-temperature eutectic welding and gives much useful data on selection and use of fluxes and alloys for a wide range of welding repairs.

AYRSHIRE INDUSTRIAL BROCHURE. Issued by the County Planning Officer, Ayr County Council, with the object of publicising and stimulating interest in the sites and facilities available for new industries in the county. The brochure is attractively produced and indicates that power, water, communications, manpower and, in fact, all the basic needs of industry are plentiful in Ayrshire.

EQUIPMENT FOR BRITISH RAILWAYS NEW DIESEL PULLMAN TRAINS. Stone equipment for the five new Metro-Cammell diesel-electric Pullman trains for British Railways includes auxiliary power, lighting and air conditioning. This new brochure by J. Stone and Co. (Deptford), Limited, Arklow Road, London, S.E.14, describes and illustrates all this equipment, but rightly devotes major space to the air conditioning, which is new to British trains.

FIBREGLASS REINFORCED PLASTICS. The problem of keeping its informative literature up to date because of the constant changes taking place in the widening field covered by reinforced plastics, has prompted Fibreglass, Limited, Ravenhead, St. Helens, Lancs, to issue a new comprehensive guide to reinforced plastics in three parts. The three sections, respectively covering a general introduction and materials; moulding techniques, design and fabrication; and properties and suppliers, are punched for insertion in a loose-leaf binder.

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COMMERCIAL MOTOR SHOW, STAND

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MUNICIPAL TRANSPORT CONFERENCE

Discussion of Papers at Douglas

IN his presidential address at the opening of the Municipal Passenger Transport Association Conference at Douglas on Tuesday last week, Mr. A. F. Neal, general manager of Manchester Corporation Transport Department, made a pointed reference to the deep divergence of view among municipal undertakings over the payment of higher wage rates or thinly disguised bonuses in the hope of attracting or retaining operating staff. Mr. Neal outlined the difficulties of management in this position and went on: "Under-takings need every assistance in this problem, both nationally and from their neighbours, rather than easy criticism and condemnation. There must be some flexibility if the essential framework of the national agreement is to be maintained and strengthened and, it is hoped, a full membership restored to those undertakings who have been in difficulty."

Acknowledging that the quality and reliability of present-day vehicles was high, he suggested that since operators did less and less repair in the old sense—it was now generally dismantling, putting in new parts and reassembling—manufacturers should be able to produce new or reconditioned units at attractive prices, leaving the operator with a minimum of work in changing over units and enabling him to concentrate on his main function of operation. Between the main unit changes at long intervals there were still far too many adjustments and short-lived units to deal with. The M.P.T.A. supports the call for box dimensions of 36 ft. by 8 ft. 2½ in.

Youngsters and Oldsters as Passengers

Operators know all the telling points against the car but they must not forget its convenience—such that even their staff owned cars though they enjoyed free travel on the buses. Above all, we must not disregard the pride of ownership of a car. It seems to equal, if not exceed, pride in ownership of one's home. We lived, in short, in a time of changing values and we must be sure we appreciated that and planned accordingly. The car could not carry all the family all the time and there was potential bus traffic even though it might include a larger proportion of children and elderly people enjoying or demanding concession fares. This was the sort of changing pattern to recognise and cater for.

It was hazardous to prophesy long-term developments but this should not preclude pre-planning, at least a state of forward thinking and preparedness. It was, for example, common knowledge that transport knows no artificial boundaries and that rigid limitation of operation to many municipal boundaries seriously reduces the standard of operation supplied. The need to apply cross-subsidisation of routes on a broader basis, i.e. as between urban and non-urban services, the probable need for subsidy in some cases and the increasing impact of the private vehicle on profits, might well accelerate a move to more public control, and no bodies seemed more fitted to play a major part than local authorities. They might before long have seriously to consider the formation of larger units, such as joint boards.

The Executive Training Scheme

These were the kind of problems, some extremely difficult, large and involved, with which the Association was faced. To continue as an efficient and necessarily streamlined service, the industry required able men, well trained in the art or profession of transport, possessing confidence in its future. To assist in meeting this requirement, the Association had instituted an executive training scheme, which started this year. Its success would depend on many undertakings taking part and each being prepared to contribute more than it expected to obtain, although, provided the scheme could be developed sufficiently, it could and should be of benefit to all members in the future.

The president and a party of members had appropriately arrived at the opening business session at the Villa Marina on a series of horse trams (the daily service being just about to commence), with Mr. Neal at the reins on the leading car. His presidential address was preceded by an address of welcome from the Mayor of Douglas, Councillor T. D. Lewis, J.P.

The papers of both Mr. McDonald and Mr. Dyson were summarised in our last issue. In the discussion on the former, Mr. J. C. Franklin (Blackpool) said he had been toying with a re-routing plan on a slightly smaller scale but now he might go much farther. Referring to the introduction of more cross-town services in the Warrington scheme, he said that when Blackpool tried this he had to put on additional buses from the centre at peak to take on people who could not get on the through buses at that time.

Mr. W. C. Wilson (Stockton) differed in his view about direct versus roundabout routes in housing estates. A local authority, by putting on a circuitous route, did take the buses to the people and thereby collect them instead of a company operator. That might seem selfish, but it was in the interests of the community. Agreeing with the speaker about the importance of seemingly trivial extensions or diversions when the annual mileage was totted up, he instanced a case of a proposed conversion to an infrequent one-man bus service where a three-quarter mile extension to an admittedly more suitable turning point would have swallowed up all the savings from one-man operation.

Similar results had been achieved at Luton, Mr. C. S. A. Wickens told conference. By 1933, as a result of the competition of private buses with corporation trams, they were left with the most higgledy-piggledy route system of any in the country. Co-ordination had been the answer in his case. Some operations along back streets were eliminated and routes were linked up. They had saved a considerable number of buses and crews and the latter found longer routes preferable to short ones only a mile or two in length. By 1952 they had effected a 10 per cent saving in bus mileage while stepping up frequencies on main road services. Throughout the period under review they had had the utmost co-operation from local authorities, including the London County Council in respect of its overspill estates. Not a road was cut without they (transport) were asked for their views.

Mr. N. Morton (Sunderland) said there had been a suggestion in the discussion that efficiency and economic stability were not synonymous. Mr. McDonald had been trying to achieve a sound economy so as to provide a public service. Councillor J. Bennett (convenor of Glasgow Corporation Transport Committee) said his undertaking was in the throes of a major scheme which offered the chance to re-route services. The principle Mr. McDonald had adopted had been applied in his city with success. Mr. T. P. O'Donnell (Ashton-under-Lyne) referred to certain problems created by the linking of cross-town routes—the provision of toilet and canteen facilities and obstruction of parked cars. Parking on main streets in the town centre could greatly affect the regularity of such routes which previously might have turned around in side streets short of the congested area.

No Other Way Out

Replying to the discussion, Mr. McDonald stuck to his view that Warrington at least was in danger of being priced out of business had it attempted to match its deficit by the conventional method, i.e. by raising fares. He agreed that bus fares were still reasonable, but reasonable or not, the public did not like them. He did not want to die like the man on the pedestrian crossing—very right but very dead.

On the question of handling the peak load on cross-town services it was true that he had to operate a minimum of extra journeys from the centre to meet that special need. Incidentally, over the years passengers had, as the result of pressure on the depart-

ment, been allowed to ride a short distance across the centre for the same fare on such services. In his scheme he had seen to it that they paid the extra fare for this facility.

Fleet Reduction

He had been questioned as to the cost of introducing the scheme. It had been possible to reduce the administrative staff by one and that had offset some of the cost. They had spent £300 on changing destination blinds and a further £200 on leaflets for every service affected, also window bills. Mr. McDonald mentioned that they had reduced the required fleet from 91 to 72 buses; he had sold two and had taken up all the mileage debts owing to the company operator and was running them off with the surplus buses while he could. This, of course, obscured the true mileage position before and after the scheme. Winding up, Mr. McDonald said that at least his transport committee had not been able to reproach him with not trying something new. He now had three or four routes yielding 42-45 d.p.m. and thus capable of carrying others; formerly there had been no such routes.

Invited to open the discussion of Mr. Dyson's paper, on servicing and maintenance of motor-buses, Mr. E. R. L. Fitzpayne (Glasgow) said that in the matter of the suitability of open-air parking, he must point out that throughout Europe there were modern open-air garages. He agreed, however, that to prove suitable they must provide more than just radiator heating. Warming of the body interior was also desirable before the bus went into service. He had found that the use of a detergent could extend the soap-washing period from six to eight weeks. He suggested that oil topping up might be performed at the same time as vacuuming of interiors since the same period of time was allowed for each operation. In Glasgow the system of nightly oil change is in force and he was glad to say that in consequence no engine was in use with dirty oil.

Vacuum Plant

Councillor J. P. Smalley (Newcastle upon Tyne), himself a fire prevention officer, warned the conference of the added fire risk of a dirty garage floor—the caked oil deposits became heated, released inflammable vapour which rapidly ignited and thus spread the area of the fire. Mr. J. C. Franklin defended present vacuum cleaning equipment, about which he had no reservations. The lightweight type of trunking available was efficient. He had engine, gearbox and rear axle oil-dispensing nozzles in the side of the pit and these delivered the exact quantity required. The automatic topping-up device was in his experience efficient and reliable.

Mr. W. C. Wilson referred to the wide divergence of view about the optimum mileage between engine oil changes, ranging from every 5,000 miles (quoted by Mr. Dyson) to the 12,000 miles in his own fleet, and the well-known case where at two garages buses never had their oil changed. Mr.

(Continued on page 42)

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Passenger Chassis at Earls Court

(Continued from page 7)

specification, notably the Gardner 6LW 112-b.h.p. or 6LX 150-b.h.p. diesel engine, a new Dennis five-speed constant-mesh or Self-Changing Gears four-speed semi-automatic gearbox, wheelbase lengths of 16 ft. 11 in. or 19 ft. 2 in. and ability to accommodate either forward or rear single-step entrance, with low-height body of 27 ft. 8 in. length taking up to 68 seats or of 30 ft. length to seat up to 76 passengers. Leaf-air rear suspension and dual-system air-pressure brakes are retained and accessibility is improved by the use of a new composite plastic-metal cab foundation and full-width front dash panel with detachable centre section.

Outstanding for being the only production double-decker with all-round air suspension and

Lancashire United colours is shown by the body-builder Northern Counties Motor and Engineering Co., Limited, on stand 44, a further example in West Riding livery is shown by Charles H. Roe, Limited, on stand 41, while a Park Royal-bodied Wulfrunian is available for demonstration in the outside park.

Features of both the chassis and the complete vehicle on the Guy stand are a Gardner 6LX engine and four-speed semi-automatic gearbox. The Park Royal 72-seat body appears in Bury Corporation colours. All Wulfrunian chassis incorporate air suspension with Guy-patented levelling valves, a four-bellows system for the rear axle and rubber-bushed linkage throughout; air-hydraulic operated disc brakes on both axles; and a handbrake

A lower low-bridge effort, 12 ft. 6 in. high, on Dennis Loline chassis by Northern Counties for Barton Transport; with side gangway upstairs it seats 68

appearance at Earls Court is a vertical front-engined Victory single-decker for export, supplementing the established underfloor-engined chassis of the same name. An example of the new type can be seen on stand 45, occupied by Marshall's Flying School, Limited, fitted with Marshall-Mulliner single-deck 65-seat body to the order of Lagos Municipality.

The Thames passenger chassis is given a first Earls Court showing by Ford Motor Company on stand 92 and it forms the basis of a new Harrington Crusader Mark II coach on stand 39 and a Duple Yeoman coach on stand 35. Others, as well as passenger adaptations of the



subject of particular interest in October last year for its demonstration run to Moscow at the remarkable average speed of over 51 m.p.h.

Leyland Lion

Leyland passenger chassis are as widely spread over the passenger coachbuilders' stands and in the demonstration park, as always, Tiger, Leopard, Worldmaster, Titan and Atlantean chassis all being represented. A new rear-engined single-decker developed for export, which reintroduces the time-honoured name of Lion, is shown by Leyland Motors, Limited, on stand 70. The Lion utilises the practice of the Atlantean double-decker in mounting the plastics-hooded engine-transmission-cooling group on a quickly removable subframe across the rear, but combines it with a substantially flat-topped frame largely following Worldmaster underfloor-engined single-decker design.

Features of the new Lion chassis include a choice of Leyland Power-Plus 140-b.h.p. or 200-b.h.p. diesel engines, automatic or semi-automatic Pneumo-Cyclic transmission and a super-efficient dust-extraction system for air entering the engine compartment. The chassis shown is one of a large order for the type placed by the United States company, Highway Products, Inc., Ohio.

Passenger vehicle operators and manufacturers who have or have had leanings towards the potential economies of the air-cooled engine should certainly visit stand 64, where Klöckner-Humboldt-Deutz A.G. shows a large-capacity Magirus-Deutz city service bus fitted with the 125-b.h.p. Deutz air-cooled diesel. The Saturn II standee single-decker, which can take up to 100 passengers, is also notable for being of integral light-alloy construction and having air suspension.

IMPORTANT CONTRACTS

B.M.C. Bathgate Roadworks

EXTENSIVE roadworks will be required in connection with the new British Motor Corporation commercial vehicle factory at Bathgate, West Lothian, including conversion of about 1 mile of the Edinburgh-Glasgow road (A8) to dual carriageway and building a new subsidiary road with flyover and slip-road junctions. A contract for the complete roadworks, valued at £350,000, has this week been awarded to John Laing and Son, Limited. Work is due to start immediately and is expected to be substantially completed by next April.

Gardner 6LX Preshow Sales

During the week prior to the Commercial Motor Show, Norris, Henty and Gardners, Limited, received orders for the Gardner 6LX automotive diesel engine to a value exceeding £600,000.

A.E.C. Boom in Australia

A.E.C., Limited, announces that its sales in Australia have reached record levels, having increased throughout 1960. During last week alone chassis to a value of £A.483,000 were ordered, including 52 Monarch chassis and substantial numbers of all types of other A.E.C. goods and passenger vehicles. The number of A.E.C.s at work on the Snowy Mountains scheme in south-east Australia has now increased to well over 50 vehicles.

Pyrene Marine Fire Protection

Among ships recently equipped with fire-protection equipment by the Pyrene Co., Limited, are the m.v. *Arcadian*, owned by Ellerman's Wilson Line Limited, fitted with a Pyrene combined smoke detecting-CO₂ fire extinguishing installation for the protection of 13 cargo spaces; the m.v. *Turakina*, owned by the New Zealand Shipping Co., Limited, which has a Pyrene smoke detecting-CO₂ fire extinguishing installation for the protection of 17 cargo spaces; and the m.v. *Dumbala* belonging to the British and Burmese Steam Navigation Co., Limited, fitted with a Pyrene-E.D.-Hol inert gas fire extinguishing installation for the protection of 14 cargo spaces. This installation utilises the combustion products of diesel oil to produce a virtually inexhaustible supply of fire-smothering inert gas at the rate of 35,000 cu. ft. per hour.

M.P.T.A. CONFERENCE

(Continued from page 41)

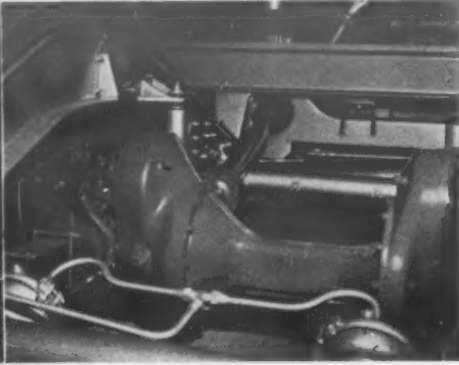
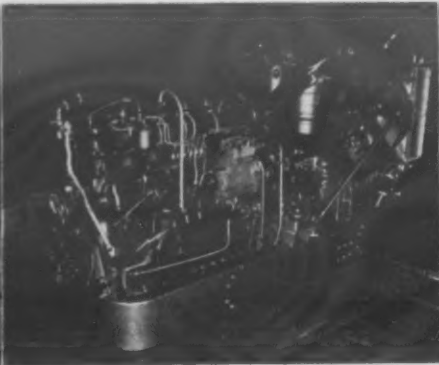
O'Donnell thought that frozen condensation in bodies parked in the open was a particular source of discomfort to passengers as it thawed out. Mr. G. H. Pulfrey (Hull) suggested that there was so much substance in the paper that the pertinent features should be discussed in detail at a future managers' meeting.

Headquarters Move to Chelmsford

This week the headquarters of the Association moved from Aldwych House, London, to Chelmsford. The M.P.T.A. had been seeking new London premises for some time but had come to the view that rents in Central London were exorbitant. To avoid an appreciable increase in subscription rates which such rent would have entailed it was therefore decided to look to areas outside, but within easy reach of, London. Chelmsford, with its electric train service, meets this latter requirement. The address is: Friars House, Friars Place, Chelmsford. Winners of the golf competition, played on the Pulrose course on Tuesday afternoon, were Alderman H. Platt (Birkenhead) and Mr. K. R. Haydock (Triplex Safety Glass Co., Limited) and the runners-up Messrs. R. Russell (Douglas) and A. C. Barlow (West Hartlepool). During the conference delegates were invited to parties organised by the Esso, National Benzole and Regent companies.



Unusual view of rear-engined Leyland Lion single-decker showing the angled driving shaft and subframe mounting; subframe-mounted engine-transmission-cooling group of the rear-engined Daimler Fleetline double-decker; and, extreme right, the drop-centre double-reduction rear axle of the Fleetline showing the nearly straight propeller-shaft line from the right-angle drive incorporated in the gearbox casing



disc brakes, the Guy Wulfrunian bus is shown in both chassis and complete vehicle form on stand 55 by Guy Motors, Limited; a complete bus in

mechanically linked to a drum brake in the transmission line. A new Guy passenger chassis making a first

popular Thames forward-control vans, appear elsewhere in the show. The Thames passenger chassis, which came into production only in 1959, was the

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COMMERCIAL MOTOR SHOW, STAND

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ROADRAILER ON PUBLIC VIEW

At Commercial Motor Show

REVOLUTIONARY CARRIER BY PRESSED STEEL

THE Roadrailer, the dual-purpose vehicle which runs on road and rail and to which we referred editorially in our September 10 issue on the occasion of its demonstration at Marylebone Parcels Depot, will be exhibited on the Pressed Steel Co., Limited, stand at the Commercial Motor Show. This vehicle, in which the Duke of Edinburgh showed so much interest during his recent visit to the Pressed Steel Cowley factory, has been developed by the company's engineers in conjunction with British Railways and British Road Services. The prototype was built at the

railway simply as a trunk route. In this form, free from the complication of marshalling yards and terminals, the railway is a highly efficient road, over which the costs of haulage are far less per ton than on a concrete highway. This simple concept enables a road semi-trailer to be the basic vehicle, the only extras required being the rail couplers and the wheel transfer mechanism. Over and above the Roadrailer, only two other pieces of equipment are required; the first is an adaptor truck which supports the front end of the first Roadrailer when on rail and which at the same



Two phases of Roadrailer operation, seen at Marylebone parcels depot: The vehicle as a tractor-trailer outfit comes in by road behind an Austin tractor and, right, standing on its "landing gear" ready for coupling into a train. The portable compressor unit for actuating the road and rail wheel change is standing by for the next Roadrailer

Pressed Steel Railway Division factory in Scotland at Linwood, near Paisley.

Goods travelling by Roadrailer make their journey in three stages. In its lorry form the Roadrailer collects a load from the dispatch point and takes it by road to the nearest railway station. There, its rail wheels are lowered—in the same fashion as an aircraft's retractable landing gear—and the load makes the main part of its journey as a wagon in a fast goods train. At the other

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wheels discs	Avon India Rubber Co., Limited.
Tyres	Goodyear Tyre and Rubber Co. (G.B.), Limited.
Tyres	Alford and Alder (Engineers), Limited.
Brakedrums and hubs ..	Owen and Dyson, Limited.
Railwheels	Gresham and Craven, Limited.
Vacuum brake cylinders ..	High Duty Alloys, Limited.
Extrusions	George Blair and Co., Limited.
Castings	British Timken, Limited.
Taper roller bearings ..	Glacier Metal Co., Limited.
Actuator bearings ..	

end, the procedure is reversed, the rail wheels being retracted and the Roadrailer converted into a lorry trailer so that it works to its final destination as an articulated unit attached to a tractor. At the Commercial Motor Show, the Roadrailer will be exhibited together with a tractor. Railway track on the stand will enable the vehicle's adaptability to be demonstrated.

Origins

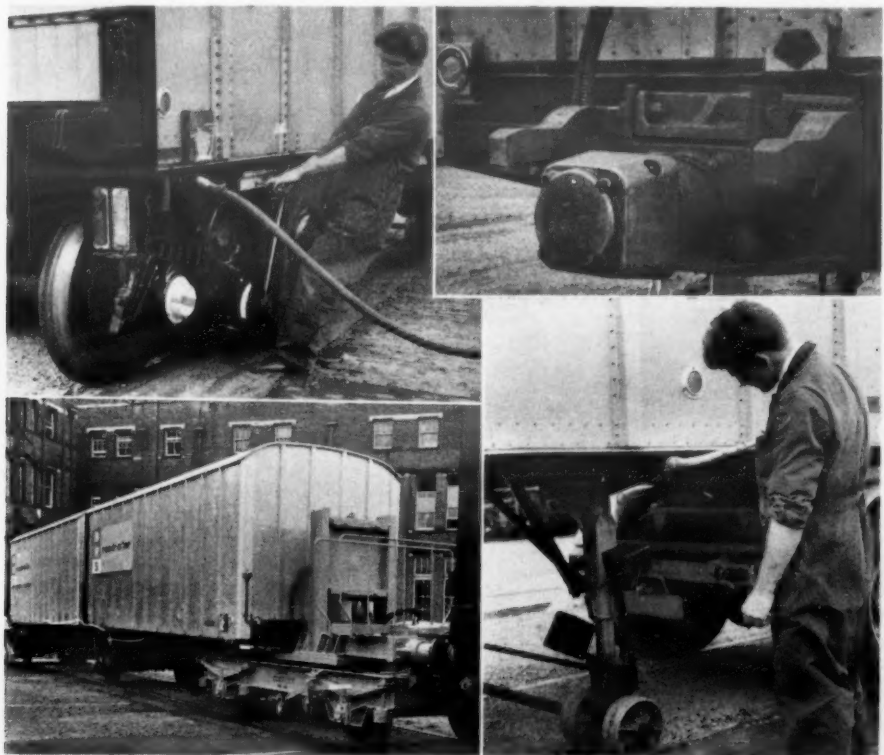
Until now the only road-rail device to enjoy extended success has been the container, which,

time incorporates the two types of coupler, i.e. the special Roadrailer coupler and the standard railway buffing and drawgear. The other is a portable air compressor at each point at which the vehicle is transferred from road to rail or vice versa; above certain traffic densities this equipment might be added to the accessories on the road tractor. Terminal facilities are of the simplest; it is necessary for surrounding ground to be built up to rail height and solidified, and parking and manoeuvring space is needed for vehicles and their road prime movers.

Components

Springing is accomplished by two Torsilastic springs mounted laterally, one on each side of a central support housing which contains the actuator gear. The springs consist of an inner steel tube; an intermediate rubber tube and an outer steel tube with the rubber tube vulcanised to both the inner and outer steel tubes. The rubber deflects in shear and acts as a torsional spring. The inner steel tube is splined internally for location purposes.

The cast steel arms carrying the road and rail wheels are located and bolted to the outer steel tube of the Torsilastic springs. At the end of the arm carrying the rail wheels is a conventional pedestal and the rail set is retained in position by two swing hangers joined to the roller bearing axleboxes in the pedestal ends by shrouded balls. The road gear arm carries the two road wheel bearing housings, which are bolted to the arm,



The Pressed Steel Roadrailer for British Road Services shown on British Railways: Air supply actuating the wheel transfer; close up of rail coupling on Roadrailer; below, Roadrailers on rail showing the adaptor truck which supports the front end and couples it to other wagons or the locomotive; and, right, "landing gear" being operated manually

whilst suitable and economic for certain types of traffic and developed more widely in Britain than in most countries, is not a device by which a railway can earn the whole of its daily bread and butter. It involves heavy tare weight on its rail journey and costly transfer equipment at the rail terminals. The Roadrailer designers set out to produce a vehicle which was free from shock, did not need to be shunted on rail and cost less to build, operate and maintain than any other form of overland equipment. The ideas developed in Britain were found also to have occurred to Chesapeake and Ohio designers in the U.S.A., and a good deal of collaboration took place which saved duplication of research.

The right way to get rid of a great proportion of equipment and operational cost was to use the

along with the brake air cylinder and brake drums.

Transfer Mechanism

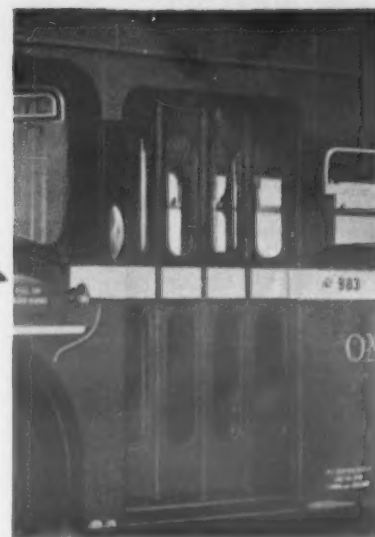
The transfer of wheels from road to rail position is performed by a reversible 6-h.p. air motor working at 80 lb. per sq.in. This motor is of the vane type, with a speed of 5,500 r.p.m.; it is located on the central support housing. This housing is attached to the rear crossload bearing members and the headstock of the underframe. The air motor is mounted at right angles to the actuator screw in such a way that the axis coincides with the upper trunnion screw. The ball screw nut unit or crosshead is attached to a forked arm situated on the actuator spline shaft which operates the Torsilastic springs and the wheel arms. (Continued on page 45)

Deans

Redro Mk III double-folding, Electrically-operated DOORS...

* as supplied to the requirements of the City of Oxford Motor Services. (Bodies by Willowbrook Ltd., Loughborough)

DEANS Beta lightweight SEAT FRAMES

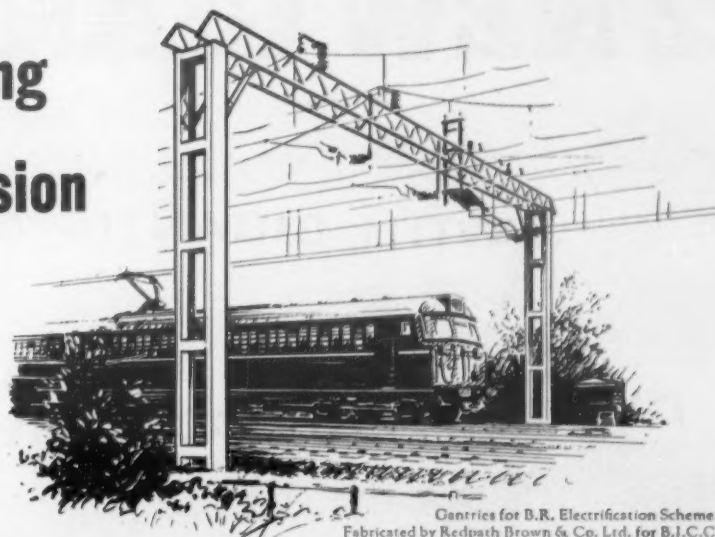


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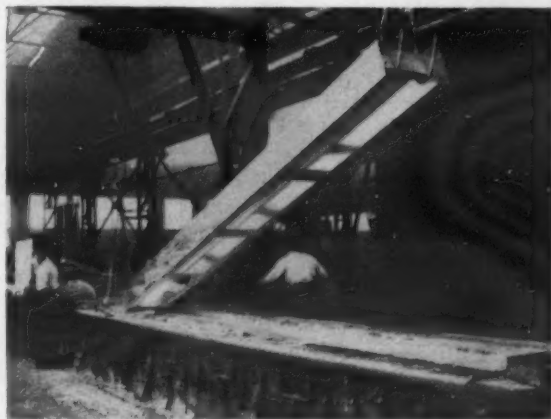
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(LONDON) LTD.

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GOODS VEHICLE BODYWORK AND SEMI-TRAILERS

Disc Brakes : Air Suspension : Plastics

ACCENT ON REFRIGERATED UNITS

NO clearer indication of the increasing diversification and specialisation which is spreading throughout road transport, public and especially private, is obtainable than by an inspection of bodywork and allied exhibits at the Commercial Motor Show. Possibly the most obvious influence at work is the demand for more refrigerated or insulated transport for frozen foods, perishables and meat.

One of the leading builders of refrigerated transport, Mann Egerton, has a typical example on its stand No. 109, designed specifically for the frozen food, ice cream and allied retail delivery trades. The resin-bonded plywood floor is overlaid with a

Homalloy bodywork on other exhibitors' stands or in the demonstration areas, apart from nine vehicles exhibited under its own aegis. Improved Homalloy tank and blowing equipment is shown on stand No. 31.

A vehicle for the ice cream trade is also shown on the Spurling stand No. 22. It is framed and panelled in light alloy extrusions and riveted sheets. The body is divided into two sections by a second full width partition; empty containers may be carried in the rear compartment. Mickelover Transport, the Unigate company, is represented at the show for the first time, on stand No. 130. Several one-piece moulded plastics van

to lightness are resulting features of this form of construction. Six examples are on view at Earls Court, one a 700 cu. ft. parcels van body on the Austin 5-ton normal control chassis for British Road Services, another a refrigerated body on the Thames Trader with County six-wheel conversion. Elsewhere, Stedall exhibits a Mickelover corrugated plastics shutter which is electrically operated. This is also a B.R.S. development (stand No. 393).

A bulk flour body with new Simon Squeezee pneumatic discharge pump, a side load pallet body, a Bulkmobile vehicle and the chassisless Super-Freighter semi-trailer with stressed skin construc-

Full marks go to Bowyer Brothers for the handsome appearance and good proportions of its reinforced plastics cabs, which are offered for several ranges of chassis. Also seen on stand No. 100 are light alloy bodies marketed under the Boalloy trademark. On a van body the rear doors are in a rebated weatherproof framework. Plastics cabs are finished internally to a high standard, e.g. doors are draught-proofed and the interior is trimmed in leathercloth.

Goods vehicle cabs of all kinds by Park Royal Vehicles—plastics, light alloy and composite—also figure on several stands throughout the exhibition on A.E.C. vehicles. The five Sparshatt bodies



A 750 cu. ft. light alloy box body of special design by Bonalack on an Austin 5-ton chassis; a fine example of Cunard bodywork (Stewart and Arden); one-piece moulded plastics container by Mickelover Transport for Irish ferry traffic; side-loading boxvan for Tate and Lyle. It is a Duramin product on Albion Chieftain chassis

plastics covering impregnated with aloxite grit for resistance to wear and this glass fibre floor is moulded in the body to form a completely watertight interior. Two vehicles incorporating this feature are exhibited. There is a hardwood framed light alloy refrigerated shipborne container. Much interest will be aroused by the Unicon 10-12 ton chassisless semi-trailer with stressed light alloy panel construction. This is an external pillar job, resulting in a flush interior. Insulated and refrigerated versions are available.

Insulated Pallet Van Body

Examples of the bodywork supplied by University Commercial and Coachwork (stand No. 72) include an insulated B.T.C. semi-trailer box body for pallet loading through side and rear doors, taking 14 38 in. by 38 in. pallets. The interior is 7 ft. wide and 6 ft. high at centre. The roof and doors are insulated with Rocksil. There are two bulkheads with connecting doors constructed between the side loading door pillars. Holmes (Preston) has no fewer than seven examples of its

bodies are exhibited, one of them, at 1,030 cu. ft. capacity, claimed to be the largest of that category yet built in this country. In addition, there is the 3,300 gal. semi-trailer stainless steel tank with automatic coupling of Mickelover manufacture. Wholly new features of this vehicle, it is stated, are the use of plastics cladding for the tank and Dunlop disc brakes on the tandem axles. These are 2 ft. 4 in. in diameter. The Scammell tractor which will draw this milk tank also has a plastics cab by Mickelover.

One-Piece Plastics Bodies

The company has been developing plastics in coachwork for the past nine years. Complete body moulds are now built for the one-piece jobs. They are rotatable to facilitate the laying up process and individual variations in body dimensions can be accepted. With a one-piece moulding neither timber nor metal are necessary as a framework. The inner and outer layers of reinforced plastics are bonded to each side of a foamed plastics core. Good thermal insulation and great strength allied

tion on Crane running gear form the display of light alloy products on stand No. 54 of Duramin. Claimed for the new air discharge bulk flour carrier is that payload is increased, so is discharge rate. The side-loading pallet van (illustrated here) weighs only 23 cwt. It is 16 ft. 2 in. long by 6 ft. 11 in. wide, with a 6 ft. clear opening. There are four sliding doors to each side of this Tate and Lyle body. They are hung at the top and operate on rubber-tyred rollers in side members at roof rail level, with slipper nylon guides at the bottom. The Super-Freighter has recently been described in our columns. Duramin has produced a low front entry cab for the latest A.E.C. range of chassis having this feature.

High-class Plastics Cabs

Marshall Motor Bodies (stand No. 45) includes among its commercial vehicle bodywork two examples of composite bodies to special requirements. The use of aluminium faced plywood secured to framework by Aerolite glue is a feature of this company's output. All joints are weather sealed.

appearing on stand No. 37 are a refrigerated unit and a container in which the frameless construction aids in reduction of heat leakage. The refrigerated body has a Thermo-King petrol-electric refrigeration unit mounted in the Luton head and is modified for pallet loading. This manufacturer offers both alloy and composite products; also on view is a 1,500 gal. domestic fuel oil tanker with reinforced plastics at vulnerable points of the skirting.

Arlington exhibits on stand No. 49 follow the customary pattern for this company, i.e. high-capacity pantechon type bodies and delivery vans. There are two light alloy furniture bodies with Chobert or Tucker riveted panels and softwood floors. An Albion Claymore underfloor-engined van on the Cockers of Southport stand No. 74 has a specially adapted body for shop deliveries of cooking fats and soaps. There is three-way loading and driver access is aided by sliding doors on either side. The bodywork has been brought forward and there is no wheelarch obstruction for the driver. In this van an unusual feature

2 NEW GIANTS BY DUNLOP

WITH GIGANTIC BUILT - IN STRENGTH... GRIP...

DURABILITY...ECONOMY...AND UP TO 20% EXTRA MILEAGE



Fantastic strength and toughness, immense wear-resistance, surpassing grip—that's what Dunlop have built into these new Giant nylon tyres.

Just look at the rugged non-ribbed tread of the RK8 with its powerful interlocking segments! Never before has a tyre offered such positive, biting grip on loose surfaces, yet the pattern is close enough and stable enough to give long mileage and traction on normal roads. This is an ideal rear tyre for heavy trucks operating on and off the road!

The RK9 is no less impressive. Here is a complementary extra-depth pattern of 3-rib design to give exceptionally long mileage with very high resistance to irregular wear. Note the 'broken', studded shoulder which gives powerful traction on soft ground. The RK9 is ideally suited to front wheels of heavy vehicles with RK8 on the rear or for all-round fitment on lighter vehicles.

DUNLOP

cm/140/413

is that wiring has been re-routed above chassis level to prevent damage and reduce maintenance costs. Much use is made of stucco light alloy sheet where paint damage is likely to occur.

A semi-trailer van for Hoover, Limited, with three floors, the upper two being removable alloy planking, and with a hydraulic tailboard loader for handling washing machines is a notable exhibit of Reall Coachbuilders (stand No. 73). Over 30 of these bodies, on Dyson running units, have been supplied or are on order. Reall specialises in mobile shops, offices or workshops. A very pleasing 445 cu. ft. or 525 cu. ft. van body, with wrap-round windshields, is a typical product of B. Walker and Son (stand No. 96) for the B.M.C. LD series 1-1½ ton chassis. Some plastics components are utilised to achieve these ends. A 2-ton version is also available. Walker bodies are traditionally of welded steel construction.

Semi-Trailers

New on stand No. 113 of York Trailer, or in the demonstration park, are the Transfour 15-ton

The Dyson Aerovan chassisless tandem axled semi-trailer with air suspension and disc brakes has been designed and engineered by this company in conjunction with Holmes (Preston), Limited, which constructed it on Dyson running units. It is of double skin alloy construction, with reinforced plastics roof. The model appearing on stand No. 106 has roller shutter side access besides the rear hinged doors. Dunlop disc brakes are specified. Some of the models shown are export orders. A mobile library unit on low-loading semi-trailer accompanies a 14-ton low-loader and a 3,250 gal. tank semi-trailer on the Eagle stand No. 85. Hands shows 27 ft. (12 ton) and 25 ft. 6 in. (15-17 ton) semi-trailer models from its range, the latter carrying a Calor gas tank, on stand No. 111.

A Range of Bulk Grain Carriers

Three new bulk vehicles form the display put on by W. B. Bawn; they include a 4,000 gal. Helmsman spirit tank mounted on one of the new Scammell Routeman rigid eight-wheelers. This vehicle is for the Crow Carrying Co., Limited. A



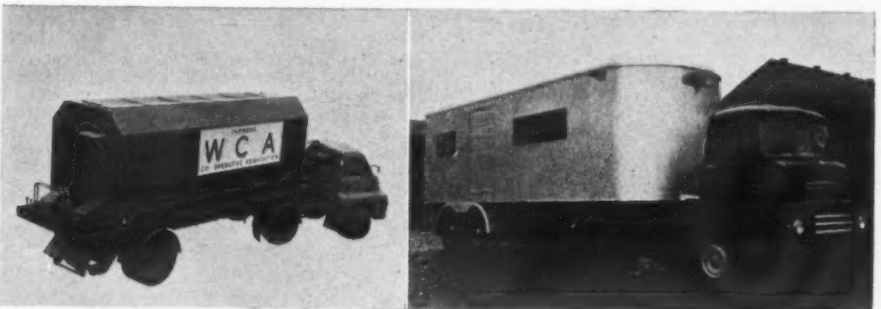
York Freightmaster semi-trailer coupled to a Guy Warrior and supplied to a West Country haulier; right, a 2,000-gal. four-compartment Bonalack aluminium-alloy spirit tank mounted on an Albion Chieftain

semi-trailer with four wheels transversely in line and a new lightweight tandem axle platform semi-trailer built to permit maximum payload within British regulations. Conventional leaf springing is employed in both instances and the tandem axle version employs standard York running gear with light steel rocker beams. Total braking area is 728 sq. in. The trailer has an all-aluminium frame with 17 in. members and crossmembers and outriggers are also alloy. Taskers (stand No. 107) again features its D-S (double safety) automatic coupling and, in the demonstration park, the rear-steering articulated unit which it developed some time ago. Taskers fifth wheel coupling with fore-and-aft tilting movement is a further exhibit.

An exhibit on the Pressed Steel stand No. 26, where it is coupled to a Thornycroft tractor unit,

sectionalised Speedifeed demountable bulk grain transporter body is shown (see illustration). This has twin auger rear discharge among its selling points. Other forms of bulk grain body are supplied. The Bawn stand No. 112. Two new tanks, both in the maximum capacity class, are on view on stand No. 108, Darham Industries. The one on a semi-trailer is intended for Continental ferry service.

Bonalack (stand No. 30) has a wider range of bodywork than most manufacturers. In this sphere of bulk carriers it has examples of its Pneumajector blown discharge vehicles to show, also a 2,000 gal. aluminium alloy spirit tank on the Albion Chieftain chassis. Mixed loads may be carried. Examples of Bonalack craftsmanship appear on stands elsewhere in the exhibition. The



W. B. Bawn manufactures this Speedifeed demountable bulk grain transporter body. It includes facilities for part load delivery. The Dyson Aerovan (right), as its title implies, has air suspension, besides which it is of chassisless construction and has disc brakes

is one of the Roadrailer semi-trailer vans which are currently the source of much speculation. J. Brockhouse has produced a new car transporter semi-trailer with improved anchorage for the cars carried. This is on stand No. 108. Another new transporter appears at the show under the name of Burtonwood Engineering. It employs the standard Taskers semi-trailer for this purpose and can carry five medium size or seven B.M.C. Minicars.

Crane Adopts Zed Wheel Arrangement

Four models representing the B.T.C. range appear on its stand No. 121. All are of the Four-in-Line pattern which has stood the company in good stead and they are of 12 or 15 tons capacity. Pride of place on the Crane stand is taken by a 45-65 ton capacity well frame trailer for B.R.S. (Pickfords). The detachable rear axles only are arranged in "Zed" formation, i.e. in two lines transversely across the vehicle. They are fitted with Crane disc brakes. Both features are the subject of patent applications. Of the two general haulage semi-trailers on show, one, a 12-15 ton in-line axle type has Firestone Airide suspension in Crane patented installation. Ferrobestos bushes are provided at pivot points (Crane stand No. 84.)

A.P.V. company specialises in both aluminium alloy and stainless steel tanks, as indicated on stand No. 124.

W. P. Butterfield has a monster 4,300-gal. double compartment stainless steel semi-trailer tank running on Dyson units, with air suspension. It appears with its Scammell Highwayman tractor unit on stand No. 125. An even larger, 4,500 gal. capacity tank for burning oil is on an A.E.C. eight-wheeler.

Exhibitors of tipping gears and other hydraulic equipments for vehicle attachment continue to introduce refinements. Anthony Hoists (stand No. 110) shows new underfloor and front mounted tipping gears. Pilot Works (stand No. 97) has a number of new features, including a new heavy-duty combined take-off and pump unit and a tipping gear providing a 55 deg. tip for 12 tons. Two exhibits have a cab warning light to indicate that body has lifted off the chassis. Nine vehicles appear on the Edbro-B & E group of three stands (20, 24 and 25), for which it is the sales division. Among the exhibits by Weston Works, actually in the demonstration park, may be mentioned an Abelson dumper, utilising a B.M.C. chassis with Weston dumper gear.

Wheels

The rail wheel assembly is a standard set using 2 ft. 6 in. diameter wheels; the journals are fitted with taper roller bearings. The roller bearing axleboxes are equipped with two ears to which are attached at the top end, by means of socket joints, the swing hangers. The swing hangers are attached at the bottom end by similar joints to the cast steel pedestal arms. The pedestal opening is designed to permit a total fore-and-aft movement of 1 in., with lateral freedom of 3 in.

The four road wheels are mounted in pairs on cast steel arms which are hinged to the outer casing of the Torsilastic spring. When the running gear is in the rail position, the road wheels contact the underside of the van floor, opening a hinge which provides satisfactory rail clearance and divorces the road running gear from the angular motion of the Torsilastic springs and high acceleration caused by rail joints.

(To be continued)

Roadrailer at Earls Court

(Continued from page 43)

By holding the inner tube stationary in relation to the body, the rail and road wheels are elastically supported in respect of the body. By revolving the inner tube, either the road or rail wheels may be brought into running position.

For actuation of the transfer mechanism air is supplied to connections at the side of the vehicle, above the wheel transfer mechanism. A poppet valve on the air motor is operated manually by a lever connected to a hand control and controls the air driving the motor. Another control changes the direction of rotation. When the poppet valve is open, air enters an overspeed regulator orifice in the body of the motor which houses the governor. Direction of rotation is controlled by an eccentric cylinder having inlet and outlet ports to coincide with the air supply.

Actuator Mechanism

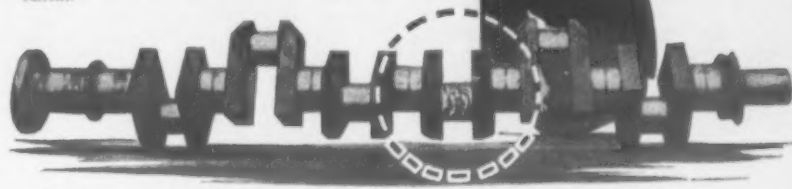
At the same time as air is supplied to the motor, a bleed is taken to a piston at the opposite end which depresses clutch springs, thus allowing the brake disc to be relieved from the clutch surface. The clutch, which is installed between the motor and the driving pinion, holds the running gear in the selected position and absorbs energy on descent by acting as a brake.

The air motor drives the actuator screw through a bevel pinion and epicyclic gearbox. The actuator screw is silver-plated to prevent corrosion and

Barimar Saves Big Crankshaft from Scrap Heap

... and sends it home like new

This crankshaft had to be taken out of service. It is the crankshaft of a diesel engine which is part of the equipment that provides a Government establishment with electrical current.



THE DAMAGE to this CRANKSHAFT was done by a connecting rod that broke.

As a result No. 3 big-end bearing of this large engine had come adrift, damaging the journal of the crankshaft and bending the shaft, which is 9 ft. 6 in. long. The establishment, being in a remote part of the country, depended upon the plant for its supply of electricity. Barimar was at once approached as to the feasibility of a speedy and reliable repair, and also to give an answer to the anxiously awaited request of "How soon?" The crankshaft duly arrived with a journal badly gouged and bent. The damaged journal was built up in the Barimar workshops and the shaft straightened so as to be in perfect alignment. The built-up journal was then remachined to its original size, to be suitable for a standard-size bearing.

Barimar restored the crankshaft to service with the minimum of delay. The cost was low and the job guaranteed.



This skilled repair was carried out quickly and conscientiously, and put the crankshaft back into service with a minimum of delay. That shaft might well have been "scrapped" had not Barimar guaranteed a "good as new—sturdier than ever" repair, avoiding the need—and the inevitable delay—of an expensive replacement. How efficient!—For the simple reason that a Barimar repair tag is its own indisputable guarantee. WHATEVER THE DAMAGE—a letter, wire or 'phone call to Barimar is always a counsel of wisdom and saves time, money and anxiety. Barimar is always available any hour of the day or night.

Experts will gladly advise you at any hour of the day or night, in the event of a breakdown in machinery. Please remove fittings and consign all broken transportable parts CARRIAGE PAID. Post instructions or order. When it is impossible to transport damaged machinery Barimar experts will operate ON THE SPOT.

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of advanced design for a wide range of trucks.
Powerful stable braking.
Reserve of lining instantly visible: linings replaced in a few minutes.

DISC transmission brake (mechanical)

This forms a most efficient hand-brake, combining the advantages of the disc brake with those of the transmission brake.

DRUM brakes

The famous Lockheed series, now supplemented by a new range for vans, trucks, and commercial vehicles.

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Air Servos for all types of vehicles.
Power Hydraulic Brake equipment for public service vehicles. Also Hydraulic Clutch Controls.

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OFFICIAL NOTICE

THE TRENT MOTOR TRACTION CO.,
LIMITED

SECRETARY/ACCOUNTANT

THE Trent Motor Traction Co., Limited, which has its headquarters in Derby and operates a fleet of some 400 public service vehicles, invites applications for the position of Secretary/Accountant, which will become vacant in March next on the retirement of the present holder of the office.

The commencing salary will be in the order of £1,650/£1,750, depending upon the qualifications and experience of the successful applicant. There is a Contributory Pension Scheme.

Applicants should be between the ages of 30 and 45, possess a recognised accountancy qualification and must have a sound practical knowledge of company taxation. Previous experience in the passenger road transport industry, although not essential, would be an advantage.

Written applications, stating age, education and family status, and giving particulars of past and present employments and present salary, should be sent under private cover to the General Manager of the Company, at Uttoxeter New Road, Derby, by 7th October, 1960.

A Subscription to

MODERN TRANSPORT

will keep you in touch
with all British and Foreign
transport developments

Perkins Direct-Injection Engine

(Continued from page 18)

fitted above the gudgeon pin and one scraper ring below. The top compression ring is chromium plated. The gudgeon pins are fully floating and are located axially in the pistons by circlips.

The connecting rods are of high-tensile steel to B.S.En.17U with H-section shanks. The big end is split at right angles to the axis of the rod, the cap being located by serrations and secured by two high-tensile steel bolts, locked by locknuts. Thin-wall pre-finished steel-backed copper lead-lined big-end bearings and lead bronze steel-backed wrapped small-end bushes are fitted.

Lubrication System

An eccentric-rotor oil pump, secured to the cylinder block, is driven through a serrated extension of the fuel pump worm gearwheel. The oil is delivered by the pump through a full-flow filter to the main gallery drilled lengthwise through the crankcase. The filter incorporates a bypass delivery relief valve. Drilled holes through the main bearing housings carry the oil from the main gallery to the main bearings, from where it passes through drilled holes in the crankshaft to the big-end bearings. The cylinder bores, small-end bush and gudgeon pins are lubricated by splash from the big-end bearings. A reversible die-cast aluminium sump is fitted, together with a pressed-steel detachable well.

As with other recent Perkins engines, the fuel-injection pump is the C.A.V. DPA distributor unit, mounted vertically on the left-hand side of the engine and driven through a worm gear from the auxiliary shaft. An extension of the auxiliary shaft can be used to drive either an exhaustor or compressor at engine speed. The fuel pump can incorporate an automatic advance and retard mechanism for variable speed applications and the engine speed is controlled by a hydraulic governor incorporated in the fuel pump. A mechanical governor can be supplied as an alternative for close governing. A fuel lift pump of the diaphragm type and equipped for hand priming is mounted on the cylinder block and operated by an eccentric on the engine camshaft. The atomisers are located on the left-hand side of the cylinder head in an accessible position.

Provision is made for mounting a paper-element fuel filter on a pad on the left-hand side of the cylinder head. The induction manifold in aluminium has provision for a C.A.V. Thermostat

heater for starting at low ambient temperatures.

A centrifugal water pump mounted on the front of the cylinder block is belt driven from the front of the crankshaft. Alternatively, the water pump can be mounted in a high position at the front of the cylinder head. A pressed-steel fan can be fitted at the front of the water pump pulley. The coolant is circulated from the pump through a cored hole at the front of the cylinder block to the water rail cast in the side of the block. A water outlet connection is fitted at the front of the cylinder head, which incorporates a bellows type thermostat. A tapping is provided in the water outlet connection to provide a water feed to cab heater, when fitted, and the return feed is to the water pump inlet side. A water thermometer may be fitted into a tapping in the cylinder head.

Electrical equipment is 12 volt. The dynamo is mounted on the right-hand side of the engine and is driven from the front end of the crankshaft. Tension of the drive belt is adjusted by means of a slotted link. An axial-engagement starter motor can be supplied for flange mounting to the flywheel housing or backplate. A power steering pump can be driven in line behind the exhaustor or compressor unit when fitted.

METAL FINISHING ADJUNCTS

New Pyrene Products

INTENDED primarily for use on Parkerized or Bonderized surfaces, two new finishes introduced by the Pyrene Co., Limited, are designed to provide improved performance and appearance. Parker finishes P45B and P45C are quick air-drying stain materials for application by dip or spray, the C formula giving a clear film and the B a uniform black surface. They are formulated to give a slight reaction with underlying phosphate coating or a bare steel surface so as to provide maximum adhesion and sealing value and a minimum tough and flexible film thickness. Although superior when applied to Parkerized or Bonderized surfaces the 45 finishes are also claimed to give a high degree of corrosion resistance to bare surfaces. The new finishes can be overpainted when required.

MODERN TRANSPORT
SEPTEMBER 24, 1960

B.M.M.O. DOUBLE-DECKERS

(Continued from page 29)

control, both units by Self-Changing Gears, Limited. Clutch and gearbox are unit-mounted with the engine and because of their location towards the nearside, an offset gear train is bolted to the rear of the gearbox to bring the output shaft into line with the under-driven worm-gear rear axle, to which it is coupled by a short open shaft.

Disc Front Brakes

Girling disc brakes are fitted at the front, with two single-cylinder caliper units to each disc, and 17-in. drum brakes are fitted at the rear. Hydraulic actuation has been selected as being compatible with both disc and drum brake operation and incorporates the Lockheed 4 to 1 boost continuous-flow system. Marles steering gear is used in conjunction with a Hydrosteer hydraulic servo. Tyres are 11.00-20 front and 10.00-20 twins rear. The vehicle has a wheelbase of 16 ft. 9 in., a front overhang of 6 ft. 8 in. and a rear overhang of 6 ft. 5 in. in overall length of 30 ft. and width of 8 ft. Unladen height is 14 ft. 6 in. and the unladen weight is 8 tons 10½ cwt.

The uncomplicated central-gangway layout gives an air of spaciousness to each saloon and this is enhanced by the white and peony red interior decor adopted and the high standard of finish achieved in the combination of pigmented plastics, Vynide, Vyweld and Formica panelling and trim, all of which have been adopted to avoid the necessity of periodic interior painting. Seats, 35 downstairs and 43 up, are on Accles and Pollock tubular frames and are upholstered in moquette over Dunlopillo. Seat backs are Vynide-covered pressed board with individual squabs designed to be renewable fixed to the backs by adhesive. Both floors are of ½-in. plywood covered with cork-rubber compound in the lower saloon and wooden slats in the upper. Main windows in both saloons have Widney Famco twin-sliding top sections, while Auster double deflector ventilators are fitted at the front and Auster hinged D lights at the rear of the upper saloon. Two Smiths heaters are fitted in the lower and one similar unit in the upper saloons. The upper-deck rear window forms an emergency exit and the lower-deck emergency door is fitted in the rear offside.

65 YEARS OF COMMERCIAL
VEHICLE PRODUCTION

(Continued from page 13)

bigger Terrapin II, which had the distinction of incorporating compressed-air equipment through which tyre pressures of all wheels could be adjusted on the move to suit varying surface conditions.

If emphasis has so far been placed on off-road and specialist vehicles, it is because it is in these fields that the Thornycroft company excels. But it would be doing the company less than justice to lose sight of the long line of ordinary goods and passenger vehicles recalled by such names as Handy, Nippy, Taurus, Trident and Sturdy in the goods side and Lightning, Cygnet and Daring in the passenger field. Design of all these benefited from experience with early special-purpose vehicles and in their turn contributed to the design of the current range of superlative Mastiff and Trusty maximum-capacity road vehicles and Nubian, Big Ben and Antar off-road and specialist types.

Desert Bus

Many operators regretted that production of Thornycroft passenger vehicles was not resumed after the 1939-45 war. Even so, the company has not entirely severed its connection with the passenger vehicle industry; the passenger versions of the Amazon six-wheeler have already been mentioned, while a passenger version of the Trident is still in production for overseas operation, where its rugged construction and high ground clearance are valued on some of the tougher routes. Trusty tractors have also been adapted for passenger service in two articulated trans-desert buses operated by Iraq Petroleum Company. With Mulliner integral double-skin insulated 30-seat body on a Crane bogie, these 53-ft. long vehicles have a top speed of 55 m.p.h. and a range of 500 miles.

The current Thornycroft range includes the Swift and Swiftsure of 4 to 6 tons capacity; the Trident of 8 tons capacity; the Mastiff and Trusty range of maximum-capacity four-, six- and eight-wheel trucks; Nubian four-by-four and six-by-six high-performance cross-country chassis; and the extra-heavy range comprising Big Ben for up to 31½ tons solo and 60 tons with trailer, the Medium Antar for up to 47.3 tons solo and the Mighty Antar for a similar weight solo and 130 tons with trailer. All except the big Antar are powered with Thornycroft diesel engines, the Big Ben and Medium Antar both taking the 200-h.p. turbo-charged six-cylinder 11.3-litre unit.

Sandmaster

Traditionally, specifications of current Thornycroft vehicles, particularly of the specialist types, are variable to fit in with customers' requirements. This has led to the development of the Antar Sandmaster, which can be fitted with Rolls-Royce or Cummins diesel engines and Self-Changing Gears or Allison semi-automatic transmissions and huge 21.00-25 tyres for maximum traction over desert terrain. Some dozens of this type are now going through the Basingstoke shops for oil companies.

Typical of these is the six-by-four Antar Sandmaster articulated tractor for a gross combined weight of 172,000 lb. on the company's stand at Earls Court. It is one of 12 built for Esso Petroleum Company, with special equipment to meet operating conditions in Libya, where long journeys into the interior will be made without facilities for refuelling. It is powered by Rolls-Royce turbocharged 300-b.h.p. diesel engine having a maximum net torque of 850 lb./ft. at 1,300 r.p.m., while transmission comprises S.C.G. 20-in. fluid coupling and eight-speed semi-automatic gearbox and double-reduction (overhead worm and epicyclic) driving axles. Other features include hydraulic steering servo, air-pressure brakes, power-driven winch and headache rack, a 750-imp. gal. fuel tank to provide extensive range, a tubular front bumper acting also as a 16-gal. water tank and a works-built plastics cab.

Other recent developments, details of which appeared in our last issue, are the introduction of a new extra-heavy-duty range of tipper or dumper chassis, an example of which also appears at the Earls Court exhibition and the development of the current range of diesel engines to produce higher powers. Typically, conditions in the field of operation of the new dumper have been very closely studied in evolving the specification. Undoubtedly, it will be worthy of the Thornycroft traditions of sound vehicle engineering built up and jealously guarded through 65 years.

LAYCOCK ENGINEERING LTD.—STAND 367

Manufacturers of flexible couplings and propeller shafts, centre bearings, universal steering joints, garage equipment and the famous Laycock de Normanville overdrive. New products include the Laycock-Haussermann clutch and Laycock T.R. couplings.

HARDY SPICER LTD.—STAND 368

Progressive development has more than met the technical demands of the Motor Industry. Whatever the future requirements of engineers and designers may be, the intensive research carried out by Hardy Spicer ensures that their propeller shafts and universal joints will be capable of meeting them.

SALISBURY TRANSMISSION LTD.—STAND 366

Included in new products are Powr Lok differentials which provide maximum traction automatically under all road and weather conditions. Deficiencies in the orthodox differential, where if one wheel spins there is no traction available at the other, are overcome. Salisbury axle units are also being manufactured for independent suspension systems.

FORGINGS AND PRESSWORK LTD.—STAND 365

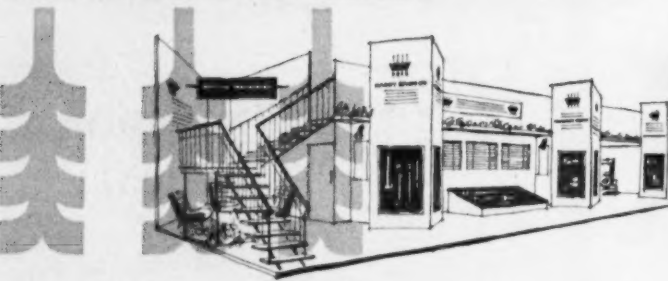
Cold extrusions in steel manufactured by this Company make possible the production of generally symmetrical parts to close tolerances. Many machining operations are avoided for such parts as shock absorber cylinders and power steering units. Forgings and Pressings used throughout the motor industry will also be displayed.

THE PHOSPHOR BRONZE CO. LTD.—STAND 364

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SHOTTON BROS. LTD.

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INTERMIT LTD.

Filters for fuel pumps, carburettors, engine sumps and oil pumps; special air and oil filters for diesel engines; edged ventilator gauzes.

RAILKO LTD.

Self-lubricated suspension, steering and track rod end bearings. These will be incorporated in vehicles on various manufacturers' stands.

SOCIAL AND PERSONAL

B.E.T. Directorate

THE British Electric Traction Co., Limited, announces that Mr. W. T. James, O.B.E., having reached normal retiring age, will be retiring at the end of the year. Mr. James's association with companies which are now part of the B.E.T. organisation dates from the formation in 1922 of Lewis and James, which later became part of the Western Welsh Omnibus Co., Limited. He has been an executive of the B.E.T. company since 1943 and a member of the B.E.T. board since 1948. As announced below, Mr. F. K. Pointon, at present general manager of East Midland Motor Services, Limited, has been appointed to the executive staff of the B.E.T. company.

Mr. F. K. Pointon, A.M.Inst.T., at present general manager of East Midland Motor Services, Limited, has been appointed to the executive staff of the British Electric Traction Co., Limited, with a view to his appointment to the boards of associated companies. Mr. Pointon joined the traffic department of the Potteries Motor Traction Co., Limited, in 1947 after service in the R.A.F. and



Mr. F. K. Pointon

was then with Ribbles for three years under the British Electric Traction group's training scheme, returning to P.M.T. as commercial assistant in December, 1951. From 1953 to 1958 he was general manager of Hebble Motor Services, Limited, whereafter he transferred in the same capacity to East Midland.

Having regard to increasing developments within the business, Mr. J. D. Muskett has been appointed vice-chairman of John Buckley and Co. (Warrington), Limited, the road haulier, and Mr. W. A. Walmsley becomes managing director.

An Oldham bus driver, Mr. G. Whitehead, has been awarded a T.U.C. scholarship to McGill University, Canada. He leaves next month for three months' study and tour of the Dominion. Mr. Whitehead is 40.

Mr. J. Watson, at present general manager of Thos. Cook and Son, Limited, for the East and Far East, is due to take up his new position as its air travel manager in London on November 1. Mr. Watson joined the company at its Glasgow office in 1937.

Mr. D. P. Carr, general manager of the track-work division of Edgar Allen and Co., Limited, has left on a two weeks' tour of the Argentine railways and tramways. Mr. Carr will meet executives and engineers of both transport systems to discuss the progress of current contracts and investigate traffic conditions with a view to developing further business.

Personalities in the shipping and fishing industries in the Humber area were guests of the Marconi International Marine Communication Co., Limited, at the new Marconi House, Osborne Street, Hull, this week, when they inspected the facilities offered by the new premises into which the Marconi Marine Company's Hull service depot recently moved.

The London Transport Executive announces the following appointments and changes in organisation with effect from September 19:

Mr. R. M. Robbins, hitherto secretary and chief public relations officer, to be chief commercial and public relations officer.

Mr. J. D. C. Churchill, assistant secretary, to be planning officer in the commercial department.

Mr. W. E. G. Hewings, works officer, to be assistant secretary and works officer.

The University of Birmingham announces among extra-mural studies a course (reference AH4) on railway history, for which the tutor is Mr. C. R. Clinker, president of the Railway and Canal Historical Society. There will be 20 meetings on Thursdays between 7.30 and 9 p.m., beginning on October 13, at the Birmingham Library in Margaret Street. The fee will be £1 and applications should be made to the Director of Extra-Mural Studies, University of Birmingham, Birmingham Library, Margaret Street, Birmingham.

Commonwealth Electric Traction

(Continued from page 5)

overhead system. In later years this was extended in both directions until, in 1937, the electrification was completed between Durban and Volksrust, the total route-mileage being 404, including a branch from Ladysmith to Harrismith. As the electrification proceeded, locomotives of 1,200 h.p. were ordered at intervals. Some of the earlier locomotives have recently been replaced, and no fewer than 225 locomotives, each of 2,000 h.p. have been ordered in Britain.

These locomotives, designated class 5E, are of the B-B type, weigh 83 tons, are capable of a maximum service speed of 60 m.p.h., and can negotiate a minimum curve of 4 chains. The superstructure forms an integral part with the underframe, and is connected to the bogie by means of a cross-member with downward projections rigidly bolted to a cast-steel bolster. This bolster is supported by two semi-spherical grease-lubricated side bearers. These bearers form the upper half of man-

Locomotive Engineers' Awards

THE following awards for papers have been made by the council of the Institution of Locomotive Engineers and were announced at the general meeting on Tuesday this week when the retiring president, Mr. R. A. Smeddle, made the presentations:

The Frederick Harvey Trevithick award to Mr. C. F. Ryan (member) and a special award to Dr. B. B. Hundy (non-member) for the paper "Steel Wheels and Tyres."

The Institution of Locomotive Engineers award to Professor Dr. Ing R. Roosen (non-member) for his paper "The Class 25 Condensing Locomotives on the South African Railways—Design and Operating Experiences."

The Alfred Rosing Bennett award to Mr. W. L. Topham, O.B.E. (member) for his paper "Methods of Reducing Flange-Wear on Diesel and Electric Bogie Locomotives."

The Charles S. Lake award to Mr. K. P. Brockway (associate member) for his paper "Aluminium Technology and Railway Rolling Stock."

The William Alexander Agnew award to Mr. G. E. Scholes (non-member) for his paper "The Swindon-Built Diesel-Hydraulic Locomotive."

The Stewart-Dyer awards: (i) To Mr. A. Singh (associate member) for his paper "The Choice of Compilers and Draft Gears for Indian Railways." (ii) To Messrs. M. O. Attock (member) and S. Fletcher (associate member) for their paper "Some Ideas on the Maintenance of Diesel-Electric Locomotives."

The Graduates' award to Mr. L. S. Thorpe (graduate) for his paper "Control Scheme of Diesel-Electric Locomotives Nos. D.5500-D.5519."

We regret to record the death of Mr. C. Darwent, A.M.Inst.T., deputy general manager of Sheffield Transport Department since 1947. He was 61.

Mr. A. J. Scamp has been appointed a director of F. Perkins, Limited. He will be associated with group personnel and industrial relations activities.

The British Transport Commission announces the following appointments:

Mr. A. J. Rogan, surveyor, Lloyd's Register of shipping, London, to be assistant shipbuilding officer.

Mr. H. H. Ogilvy, electrical engineer, Admiralty Engineering Laboratory, to be principal scientific officer, electric traction research section, B.R. central staff.

Mr. H. Pearson, who has been with the company for twenty years, has been appointed a director of the aero engine division of Rolls-Royce, Limited, and chief engineer (performance and research). Other appointments include those of Mr. R. Nicholson, to be director of the aero division, and divisional general manager of production, and Mr. R. M. Kendall, former general manager of Rolls-Royce of Canada, to be general manager, sales and service, in the aero division. Mr. J. Wood is to become the new general manager and vice-president of Rolls-Royce of Canada, with Mr. D. Boyd as his deputy.



Former Metropolitan Railway locomotive No. L.44, built in 1896, at the head of a special train which ran over the Chesham branch of the Metropolitan Line on the evening of Saturday, September 10, to commemorate 71 years of steam services on the branch. The line has now been electrified and has been worked by electric trains since September 12

Photograph shows (left to right): Driver C. W. Robinson; Councillor A. H. J. Baines, chairman, Chesham U.D.C.; Messrs. R. M. Robbins, secretary and chief public relations officer, London Transport; Alex J. Webb, assistant operating manager (railways); and F. D. Rose, public relations officer

Mr. R. H. Weir, C.B., at present Director-General of Engine Research and Development at the Ministry of Aviation, has been appointed director of the National Gas Turbine Establishment at Pyestock in succession to Mr. H. Constant, C.B., C.B.E., F.R.S.

Typical of the arrangements made by the United Kingdom Railway Advisory Service for visitors from overseas are those of last week for Senor Carlos Düring, chief permanent way inspector, Valparaiso—Santiago division, Chilean State Railways. He saw track relaying by machine on the Western Region; the Dorman Long works at Darlington; the L.M. rail welding depot at Castleton; long-welded rail and concrete sleepers at Warrington; the Elliott track recording coach; tamping machines; track inspection cars at D. Wickham and Co., Limited, of Ware; and B.T.C. civil engineering laboratories. He also had an opportunity of riding on the Midland Pullman. At a cocktail party in London he and Senora Düring were received by Mr. and Mrs. S. J. Bennett for U.K.R.A.S. and by Ministry of Transport, B.T.C. and manufacturers' officers.

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Pavilion Building, Pavilion Road,
West Bridgford
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(To be continued)

Goods Vehicle Chassis at Earls Court

(Continued from page 8)

makes have earned an enviable reputation and compete strongly in export markets. Magirus-Deutz exhibits feature Deutz air-cooled diesel engines, which have been exhibited at several previous Earls Court exhibitions. Two goods vehicles are shown—a six-by-six Uranus oilfield vehicle powered by the 250-h.p. V-12 engine for up to 55,125 lb. gross weight solo and a six-by-six Saturn tipper with 145-h.p. engine for 6½-ton payload.

Mercedes-Benz exhibits are notable particularly for their fast-running indirect-injection diesel engines. The three vehicles shown are a 35-cwt. van powered by a four-cylinder diesel engine developing 46 b.h.p. (gross) at 3,500 r.p.m. and two examples of the company's two-axle range for 13 tons gross, both powered by a six-cylinder diesel set to give 110 b.h.p. at 3,000 r.p.m. Features of both the heavier vehicles—a forward-control drop-side lorry and a bonneted tipper—are exhaust brakes, all-synchromesh five-speed gearboxes and two-speed rear axles, while the tipper also has an air-operated differential lock.

On stand 66, Renault, Limited, the British associate of Regie Renault, S.A., introduces the front-drive forward-control Estafette van for 13-cwt. payloads. Four versions are shown—a standard 186-cu. ft. van, a 215-cu. ft. higher top van, an eight-seat utility and a pick-up. Features of interest in the Estafette design are all-independent suspension, which in combination with the front-wheel drive provides the very low floor level of 14 in., and quickly removable subframe-mounted engine-transmission-front-suspension group. The standard specification includes side loading door, seats for two, heater and Renault Dauphine units.

Commer and Karrier

The main centre of new interest in Rootes Group commercial vehicles this year is the recently introduced Commer forward-control 4-ton range, which features in many of its 19 standard manifestations on stand 90, occupied by the manufacturer, and widely elsewhere in the show. Since its introduction, the range has helped to boost Rootes commercial vehicle production by over 75 per cent during the first eight months of this year and has contributed towards the group's export business, which has also shown an increase of 70 per cent. Nine Commer vehicles on the stand are representative of the wide range covered, from the 7-cwt. van to the 12-ton articulated tractor, while sectioned working examples of the alternative petrol and diesel engines for the 4-tonner are also shown. A special feature of the Commer two-strokes diesel engine, which fits under the floor of 4- to 7-ton lorries and articulated tractors, permitting a full three-seat forward-control cab, is its availability as a multi-fuel unit.

Karrier Motors, Limited, the other Rootes Group commercial vehicle manufacturer, on stand 91, shows eight examples from its range, including the 1-ton forward-control van and the versatile Bantam and Gamecock types. Commer and Karrier chassis also feature on some two dozen body-builders' stands, there are others in the equipment and accessory sections and demonstration park, while supporting exhibitions at Devonshire House and Ladbrooke Hall bring the total of Rootes Group vehicles mustered for the show to more than 80.

The Rover Co., Limited, shows nine examples

of the ubiquitous four-wheel-drive Land-Rover on stand 79. Exhibits include petrol- and diesel-engined vehicles in regular form and equipped variously with hauling winches, stretcher conversions and as station wagons and fire engines. The quarter-millionth Land-Rover was produced in 1959 and there appears to be no slackening in demand for the vehicle. Despite the rising production of Land-Rovers now in other parts of the world, the home company's export sales continue to run at 74 per cent of output and the Rover Company announced plans earlier this year for building a new Land-Rover production plant at Cardiff.

New Scammells

Scammell Lorries, Limited, has two new matched articulated tractors and semi-trailers on stand 77, as well as three established vehicles from its range catering for loads from 3 to 150 tons. The two new articulated units are the Handyman—a two-axle tractor embodying units already well proved in the Highwayman range and a bogie semi-trailer with new non-reactive rubber or air suspension for 24 tons gross—and the Trunker three-axle tractor and bogie semi-trailer for gross weights of up to 30 tons. Features of note in the Trunker are a Gardner horizontal 6LX diesel engine mounted low down and back-to-front in the frame, rubber suspension of the tractor bogie and rubber or pneumatic suspension of the semi-trailer bogie.

Established vehicles on the stand are the Rolls-Royce-powered Super Constructor six-by-six oilfield tractor, a petrol-engined 3-ton Scarab mechanical horse and a diesel-engined 6-ton Scarab and semi-trailer. Five Scammells appear on body-builders' stands and six others, including examples of the newcomers are available in the park for demonstration. Sectioned assemblies on the Scammell stand comprise the heavy-duty six-speed overdrive gearbox, a double-reduction driving axle, a Scarab engine and steering assembly and a working example of the Scammell automatic coupling telescopic leg.

Standard Atlas Major

Standard-Triumph Organisation occupies stand 63, where it shows a new Standard Atlas Major van and pick-up in company with the established Atlas 12-cwt. forward-control range and a 6-cwt. delivery van and pick-up. The Atlas Major follows the general design of the earlier van, but has a 1,670-c.c. 50.5-b.h.p. petrol engine, as used in the Ensign car, in place of the 948-c.c. unit. It retains the quickly detachable subframe engine mounting and a front-end unit fitted with the Ensign engine is exhibited.

Smith's Delivery Vehicles, Limited, shows examples of its ranges of battery-electric delivery vehicles and mobile shops mounted on Rootes Group and Bedford chassis on stand 94 and in the demonstration park. Centrepiece of the stand is a 1-ton capacity Smith's NCB electric Commuter chassis of the type developed for the American market. Features of the battery-electric range are sliding doors to a walk-in cab, a swivelling seat that permits the van to be driven either sitting or standing and an optional Therm'x cab heater.

A heavy-duty newcomer to the Thornycroft range is shown on stand 69 by Transport Equipment (Thornycroft), Limited, in company with

two examples from the established Mastiff range, a home-market Trusty eight-wheeler, a bonneted export Trusty six-by-four chassis and an Antar Sandmaster six-by-four oilfield tractor fitted with massive sand tyres and designed for gross combined weights up to 172,000 lb. Ten further representative examples from the Swiftsure six-tonner upwards appear on coachbuilders' stands, including a Trusty tractor coupled to the Road-railer shown by Pressed Steel Co., Limited.

Higher-Powered Thornycrofts

New features of the Thornycroft range are diesel engines with increased outputs and the new Q6 unit, developing maxima of 170 b.h.p. and 450 lb./ft. torque, and K6S turbocharged diesel, which produces a peak output of 230 b.h.p. and a maximum of 625 lb./ft. torque, are both on view on stand 69. A distribution gearbox as fitted to the Big Ben six-by-six chassis, which provides independent front-wheel-drive control and a reversible full-power power takeoff, is also shown. Notable features of the new four-by-four tipper or dumper chassis, which is powered by the new Q6 engine and is designed for gross weights up to 23 tons, are the unusually robust spring hanger brackets and welded rolled-steel frame, a five-speed gearbox, transfer box and power takeoff gears combined in one compact casing and the dual-reservoir air brakes with a separate hand operating valve for safer working on the edge of a dump.

The Trojan display on stand 58 comprises five goods and three passenger versions of the 9 ft. 4 in. wheelbase forward-control chassis, features of which are the Perkins P3 three-cylinder diesel-engine, a four-speed synchromesh gearbox and trailing-arm independent front suspension. A dropside lorry body keeps company with four vans and 13-seat bus and coach versions.

Unipower tractors shown on stand 83 by Universal Power Drives, Limited, comprise four-by-four Hannibal and Forester tractors; both are powered by Gardner diesel engines and equipped for the extraction and haulage of timber on trailers of up to 24 tons gross weight. Also shown are the Unipower trailing-axle conversion, which is now a standard adaptation for the Commer seven-tonner, and a self-contained winch unit.

Stand 62 carries four examples of the Volkswagen 15-cwt.—two vans, a pick-up and a new refrigerated van. The well-known features of the Volkswagen include rear-mounted air-cooled engine, all-independent torsion-bar suspension and quickly removable engine-transmission unit. Typical ingenuity is apparent in the new refrigerated van, which incorporates a twin-cylinder compressor housed above the engine compartment. It is powered by belt drive from the vehicle engine while in motion and by a mains-operated squirrel-cage motor.

One of the eye-catching vehicles of the show will not be in the vehicle section at all but in the bodywork and trailer section. This is the new B.P. Autotanker shown on stand 86 by Thompson Bros. (Bilston), Limited. The Autotanker represents an entirely new approach to bulk liquid transport, achieving high payload-tare weight ratio and low centre of gravity and overall height by the use of integral construction in light alloy. Notable features of this four-axle 4,000-gal tanker are rear-mounted engine, semi-automatic gearbox, leaf-air front suspension and a wide-angle periscope rear-view system. Thompson Bros. designed and built the structure and Leyland Motors the running units to the British Petroleum Company's specification.

SHIPPING and SHIPBUILDING

Sorting Cargo at Wharf

AS an experiment, two Australian canned fruit cargoes recently arriving in London were unloaded overside into barges and moved to wharves elsewhere, for the cargoes to be sorted out either for storage there, delivery, or re-delivery to another wharf. The advantages are said to be that quay congestion is reduced at the dock, delivery to importers is speeded up, and there is less damage to cans. If successful the new handling method might be extended to Australian canned fruits generally.

Suez Dredging

SHIPPING companies have been informed by the Suez Canal Authority that vessels with a draught of 37 ft. will be able to transit the canal as from December 23. At present the maximum permitted draught is 35 ft.

Two Maiden Voyages

THE two new passenger liners of P. and O.—Orient Lines—the 40,000-ton *Oriana* and the 45,000-ton *Canberra* nearing completion in the yards of Vickers Armstrongs (Shipbuilders), Limited, at Barrow-in-Furness and of Harland and Wolff, Limited, at Belfast respectively—are scheduled to depart on their maiden voyages within six months of each other. *Oriana*, scheduled to leave Barrow for dry-docking and trials on October 22 this year, should make her maiden voyage from Southampton on December 3. Her route will take her to Sydney via Suez, from where she will make a short Pacific cruise before she sails again from Sydney to New Zealand, Suva, Honolulu and the West Coast of North America. On June 2 next year *Canberra* is scheduled to depart from Southampton to reach Sydney via Suez on June 28. Thereafter she, too, will sail via New Zealand and the Pacific islands to the western seaboard of Canada and the U.S.A. and will return to the U.K. on a similar route.

Opposition to Glasgow Harbour Bridge

THE Clyde Navigation Trust is to oppose the proposal to build an additional bridge over the river Clyde half a mile west of the last of the existing bridges. Six months ago the Trust announced that it would not oppose the bridge plan, provided it and the Corporation could reach agreement on safeguards and compensation. It is understood that a very substantial amount of compensation is claimed by the Trust, which has already stated that the bridge would put Kingston Dock out of use. The displaced ships would have to move into Princes Dock, and some of those now using Princes Dock would have to be accommodated farther west.

The basis of the objections are that the bridge clearance be not less than that of the nearby George V Bridge, which is 18 ft. 6 in. above high-water level; that the dredging difficulties caused by the positioning of the new bridge can be overcome and the Corporation recompense the trustees for any additional cost incurred; and that the trustees receive sufficient compensation for assets transferred to enable them to build a new dock and other facilities arising from the loss of Kingston Dock and the quays above the bridge, and rearranged berthage.



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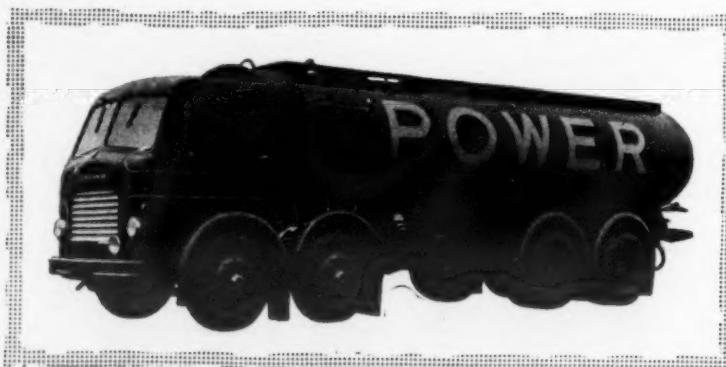
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Stand 43

MOTOR



SHOW



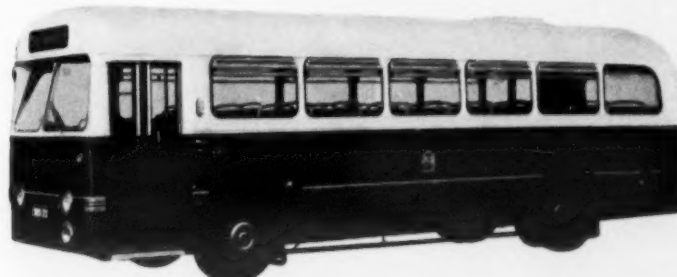
Atlantean normal height front entrance rear-engined body on Leyland
Atlantean rear-engined chassis for Sheffield Transport Department.

EARLS COURT



Aurora front-entrance 27 ft. double deck omnibus
body, on Leyland Titan chassis, for Halifax
Passenger Transport Department.

Stand 42



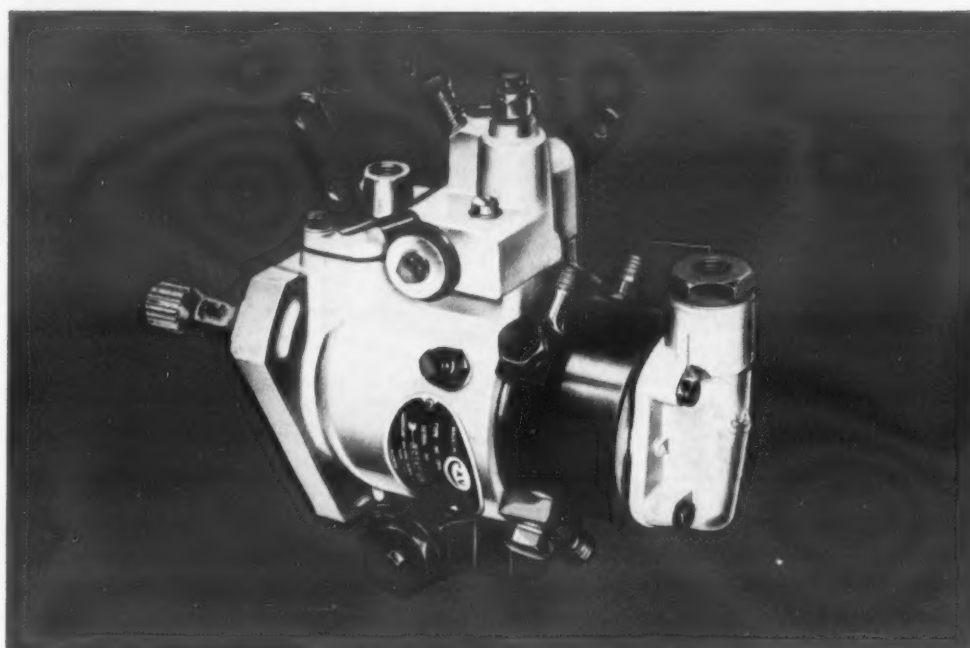
30 ft. single-deck omnibus body on Leyland Tiger Cub
underfloor-engined chassis, for Edinburgh Corporation Transport.

METROPOLITAN - CAMMELL - WEYMANN LIMITED

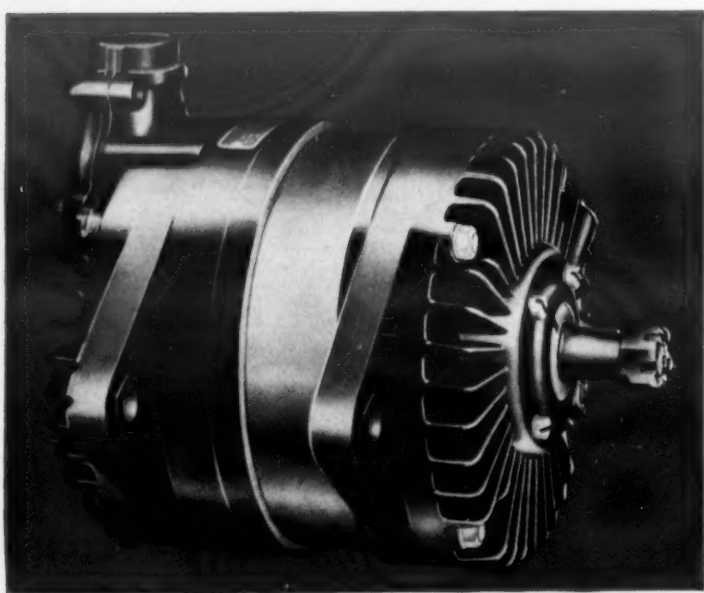
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